WIRE AND WIRE PRODUCTS

DECEMBER 1960

Give yourself the gift
of top quality production
and high volume with
MORGAN WIRE DRAWING EQUIPMENT

MORGAN CONSTRUCTION COMPANY
WORCESTER, MASSACHUSETTS
ROLLING MILLS · MORGOIL BEARINGS · WIRE DRAWING MACHINES
COMBUSTION CONTROLS

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

Lee Wilson reports on spheroidizing for . . .

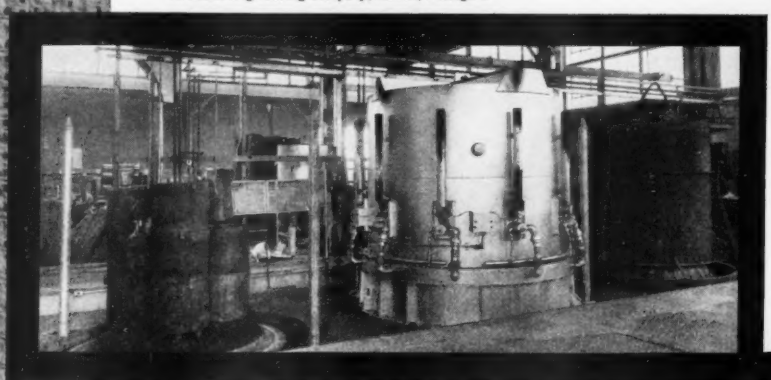
Cold extrusion of wire and rod for scrapless machining of steel parts!

The outstanding benefits achieved through the cold extrusion of steel indicate a great future for this relatively new production method. The Braun Engineering Company of Detroit, cold extrusion pioneer, has made remarkable progress in the field recently, using slugs cold headed from rod and wire.

On this page are displayed typical examples of products now being made by cold extrusion from slugs cut of rod. This is true scrapless production. For example, using green rod for spark plug cartridges (b), approximately one-seventh as much material is required as was formerly needed with hex bar, where machining was slow and expensive. Shown, in addition to the spark plug cartridge, together with the slugs from which they have been extruded, are (a) automotive brake light switch housing (c) tappet valve body with polished bearing seat (d) oil light switch housing, and (e) stop light switch housing.

The success of cold extrusion depends to a great extent on the annealing operation. Uniformity of Rockwell is absolutely important in order to hold dimensions properly in the extrusion operation; heading the slug work-hardens it to an extent that further working without annealing is impractical; and finally, the softer the slug the easier it is on extrusion tools and press equipment. Braun Engineering, like the vast majority of wire and rod producers and fabricators, selected Lee Wilson high convection bell type furnaces to get the most exacting annealing job, fastest at lowest costs.

One of the Lee Wilson Bell Type High Convection Furnaces at Braun Engineering Company, Detroit, Michigan.



Lee Wilson* ENGINEERING COMPANY, INC.
20005 LAKE ROAD • CLEVELAND 16, OHIO

HIGH CONVECTION ANNEALING FURNACES
MAKE THE BEST METALS BETTER

*ORIGINATORS AND LEADING PRODUCERS OF HIGH CONVECTION ANNEALING FURNACES

Greetings of The Season

At this Season of the Year, when hearts are lighter and the warmth of brotherly love is universal, we of Standard Industrial wish our many, many friends, customers and customers-to-be, the Merriest of Christmases and a most Prosperous New Year.

It is with a great deal of satisfaction that the Year of 1960 can be reviewed—it has brought us all new friends and successes, yet in spite of some trials, tribulations and, yes, even failures—we can still smile and rejoice.

Our best regards to the most wonderful group of men in the world—you wire men! Thank you for your many kindnesses and your unfailing courtesy to us.

Sincerely,

Standard Industrial
COMPOUNDS CO. INC.

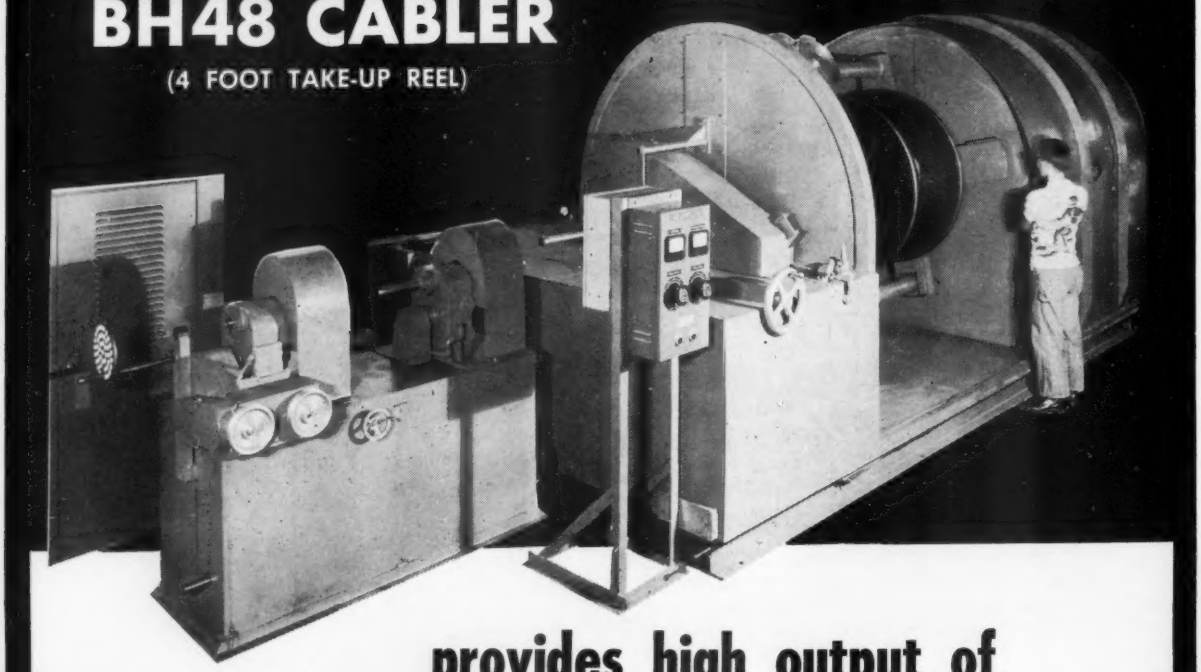
FRANKFORT, ILLINOIS
Telephones: 2131-2141

Standard Industrial has pioneered in most of the outstanding contributions to better wire drawing through better lubricants. Consult Standard Industrial for the solution of your difficult problems.

new! COOK

BH48 CABLER

(4 FOOT TAKE-UP REEL)



provides high output of quality cable at lowest cost

The Cook BH48 is truly a speed demon! At 6" lay it will produce up to 12,000 feet per hour of the highest quality cable ever. That's production! And the Cook BH48 is versatile too. Two wires . . . a hundred wires . . . or more . . . the Cook BH48 will handle any number to make cable up to 1⅛" maximum diameter. That's versatility!

Whether you twist insulated wire, uninsulated wire, or both, you can count on the Cook BH48 for economy too. It's easier to string up (because it has no capstan), easy to operate (features simplified pushbutton controls) and is available with cotton, cloth and paper wrapping attachments.

Want more information? Write today for the complete details.

SPECIFICATIONS

PRODUCTION:	12,000 ft/hr at 6" lay
FLYER SPEED:	400 rpm maximum
REEL SIZE:	48"F x 24"T x 22" barrel x 8" bore
FLOOR SPACE:	7'6" x 16'0"
LAY RANGE:	1½" to 18"
TWIST:	Right or left hand
FINISHED WIRE SIZE:	1⅛"
WRAPPING HEAD:	Optional
NEUTRALIZER:	Optional
Also Available in 36" and Other Sizes	

COOK MANUFACTURING CO.

50 EAST 25th STREET, PATERSON, N.J. • ARMORY 4-6380

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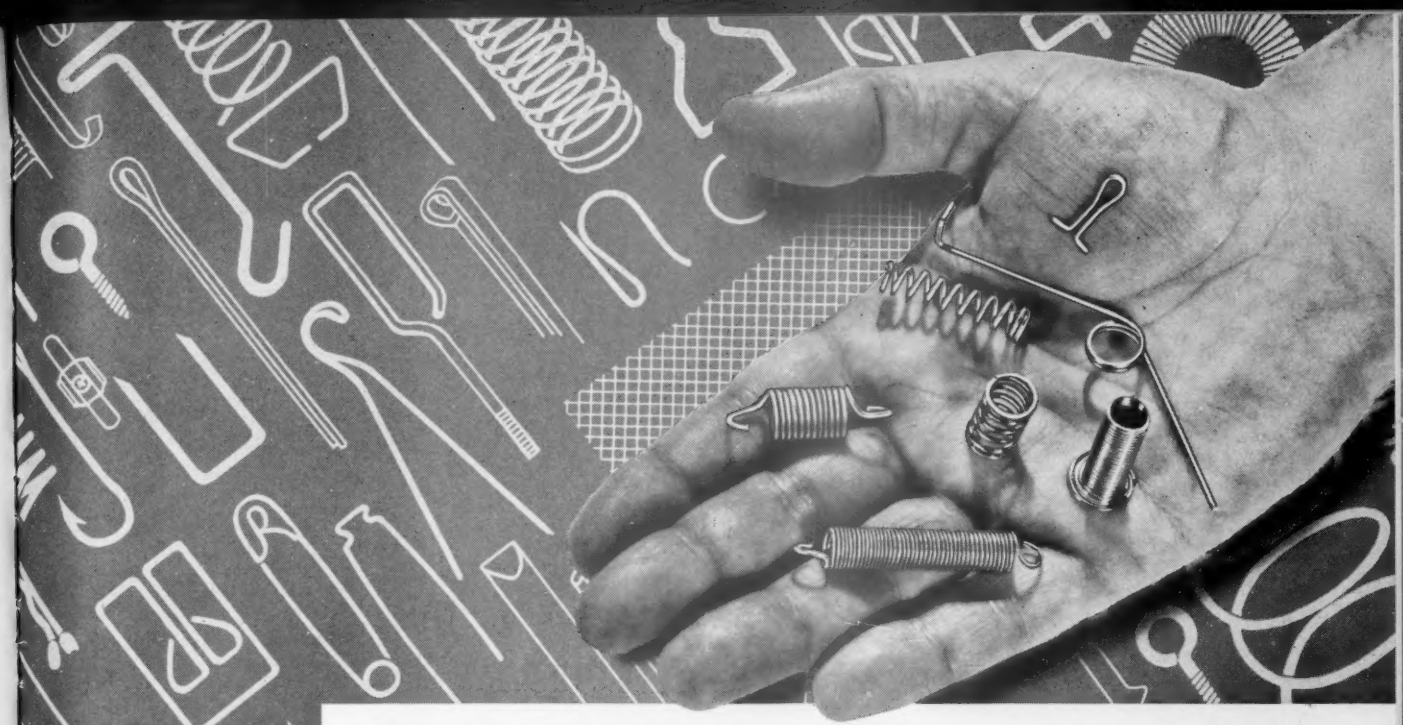
CAPAMADJIAN LE MONNIER CIE LTD., PARIS, FRANCE
CAPPY, G.m.b.H., STUTTGART, GERMANY



PAGE SPECIAL HB
Can Cut Wire Costs Up to 60%

You can use PAGE *Special* HB for many jobs where music wire has always been specified—and save up to 60% on your wire costs! Tensile strengths of *Special* HB, which is available in the size range .020″ diameter to .162″ diameter (bright finish and galvanized), approach those of music wire in all sizes—and in sizes .090″ diameter and coarser equals them! Here are some typical examples:

SIZE	STANDARD HB	*SPECIAL* HB	MUSIC WIRE
.1620	219,000 min.	249,000 min.	249,000 min.
.1350	227,000 "	258,000 "	258,000 "
.0800	244,000 "	276,000 "	282,000 "
.0200	310,000 "	320,000 "	350,000 "

If you now use music wire, or have been prevented from using it because of its high cost, it makes sense to investigate PAGE *Special* HB.

WHATEVER your wire requirements, you can count on PAGE quality from America's leading special-purpose wire mill. PAGE will give you the tensile strength, ductility, finish, tolerance and other properties you require in a wide range of manufacturers wire items — including corrosion-resistant ACCO *Aluminized* Wire and wires of special shapes.

Write for details. Write us at Monessen, Pa., for Booklet **DH-107a** for the story on PAGE *Special* HB—or for information on other wires.

ACCO

PAGE MANUFACTURERS WIRE

Page Steel and Wire Division • American Chain & Cable Company, Inc.

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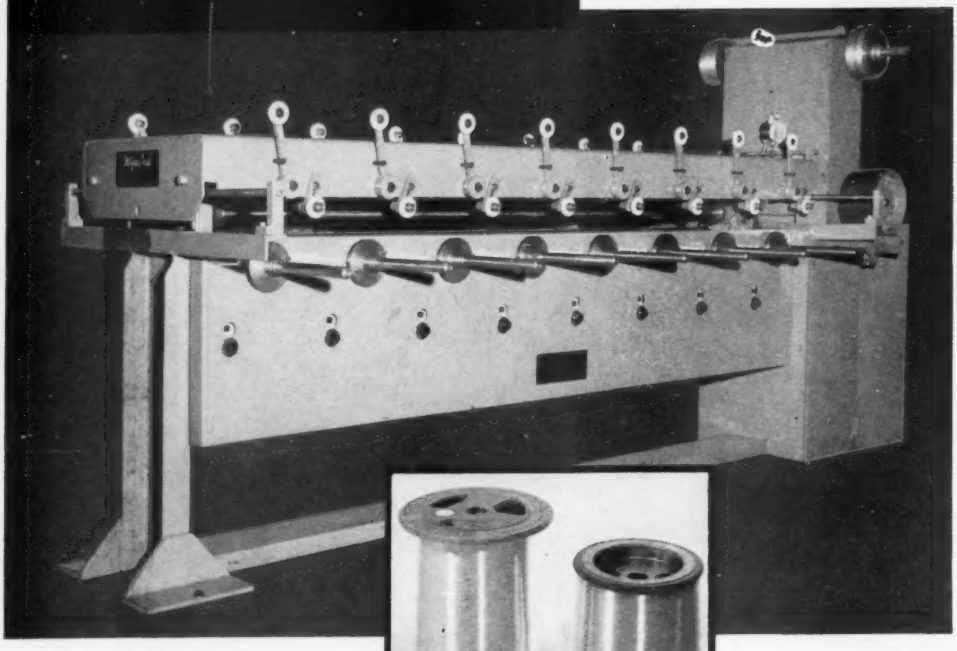
PAGE *-the source for answers to wire problems*

WYREPAK TENSION MASTER TAKE-UPS

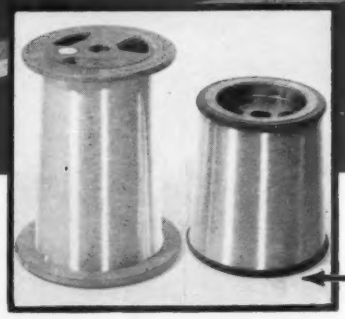


TENSION MASTER
MODEL S 13

WE BUILD FOR THE FUTURE!

Designed and built with the future in mind at the request of a forward-thinking Wire Producer for packaging finer wire in larger packages for

ECONOMY TO THE PRODUCER and ECONOMY TO HIS CUSTOMERS.



HUD-PAK 120 with #35 Tinned Copper — **HUD-PAK 50 with #38 Tinned Copper**

HUD-PAK photos courtesy of the Hudson Wire Co., Ossining Division

HERE IS THE RESULT

Tension Masters available with reel sizes up to 24" in combination reel and drum units.

THOSE INTERESTED IN ADVANCED PACKAGING PROCESS ARE INVITED TO WRITE TO

Advanced Wyrepak Co., Inc.

11 HARRISON COURT PHONE: EDison 4-4274 BRIDGEPORT, CONN.
OR The Vaughn Machinery Co., CUYAHOGA FALLS, OHIO

WIRE AND WIRE PRODUCTS*

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 35 December, 1960 No. 12

Designated as Official Publication By The Wire Association

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Workmen

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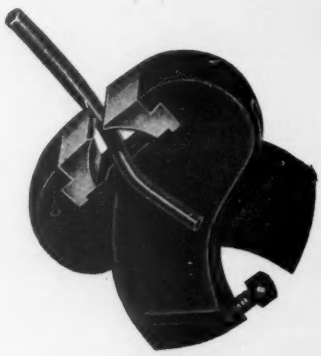
Good Tools.

Tools that produce more for them — produce more for you.

Carew cutters have given consistent quality unequaled in 90 years.



made in 4 sizes
8", 10", 12", 14"

Jaws are of hardened tool steel and are replacable

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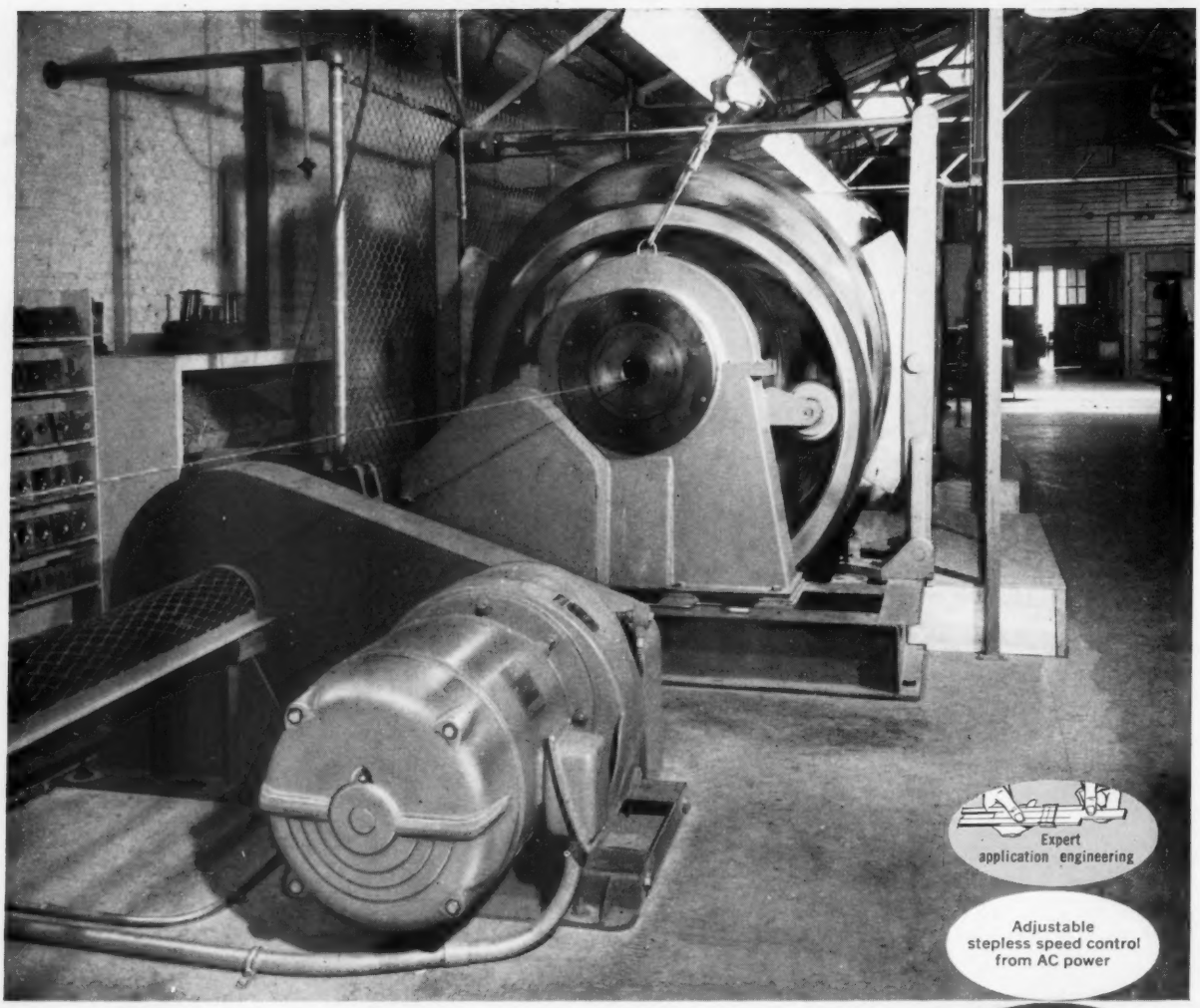

Stepless speed control provides the right twist for cabler

Louis Allis Ajusto-Spede® Drive automatically adjusts speed and/or tension for twisting fine strands into multi-conductor cable

Significant product improvement can be made in cable production if your cablers and other wire processing equipment are equipped with Louis Allis Ajusto-Spede drives and control, like the 50 hp unit shown above.

Here's how it works: You just select the speed you want, and the Ajusto-Spede delivers it steplessly. The drive glides into top speed because acceleration is precisely controlled at all times. The result: proper tension on wires for high-speed cable production with a minimum of strand breakage, downtime, and waste.

The Louis Allis Ajusto-Spede Drive can bring you the same benefits wherever you need precise control of adjustable speed and/or tension to make or process wire. Other applications include wire drawing machines, stranders, extruders, capstans, wind-ups, etc.

Let Louis Allis tailor the Ajusto-Spede drive for one machine — or to provide precise "one dial" master speed control for a multi-drive system. Sizes from 1 to 100 hp, with a broad range of electrical and mechanical modifications to meet your needs.

Contact your nearby Louis Allis District Office for further information and application help, or write for Bulletins 2750 and 2800 to the Louis Allis Company, 451 East Stewart Street, Milwaukee 1, Wisconsin.

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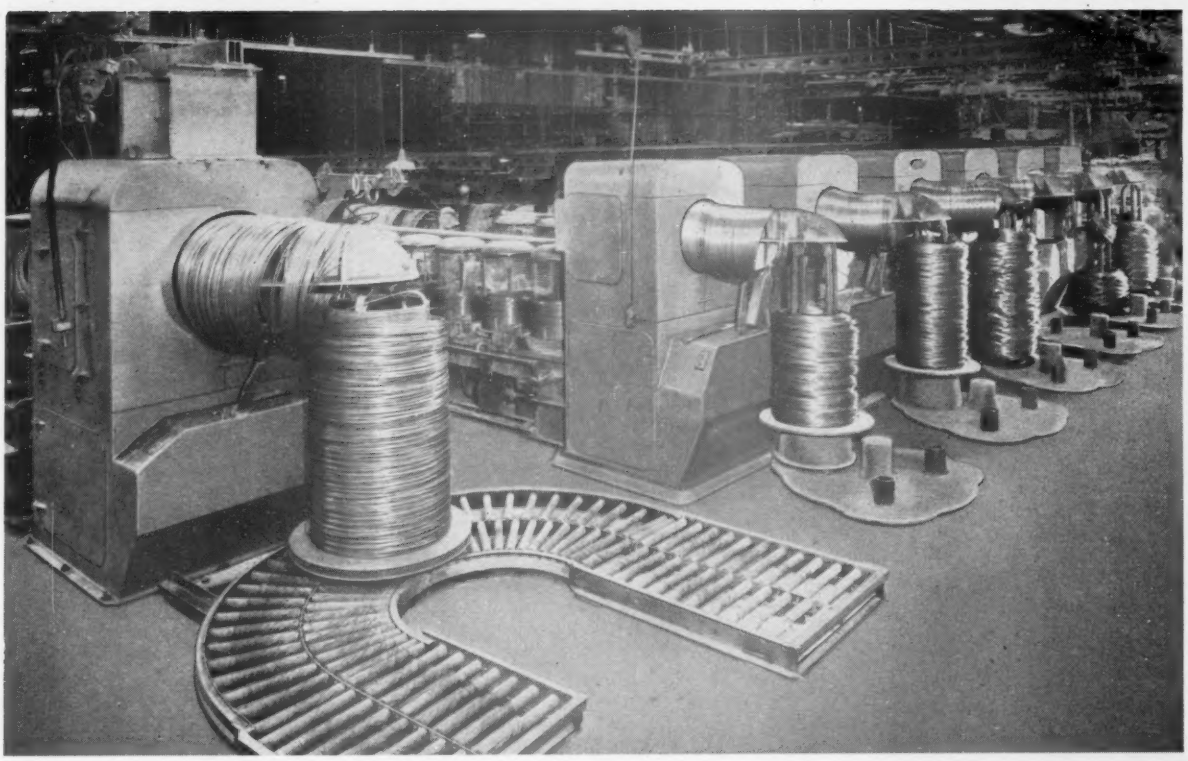
LOUIS ALLIS

AS-214

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES



A portion of Whitacre Wire Drawing Dead Block installations at Sheffield Division of Armco Steel Corp. at Kansas City

FACTS SPEAK LOUDER THAN CLAIMS!

In actual operation Whitacre Wire Drawing Dead Blocks have delivered . . .

40%

Increase in Production

39%

Decrease in Costs!

Let us prove this statement. Investigate today!

WHITACRE CORPORATION

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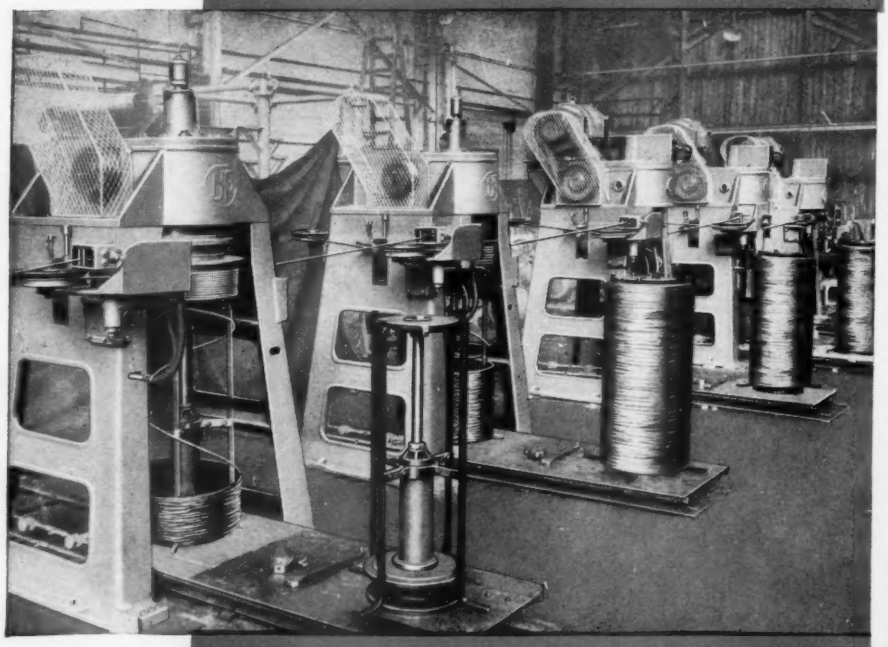
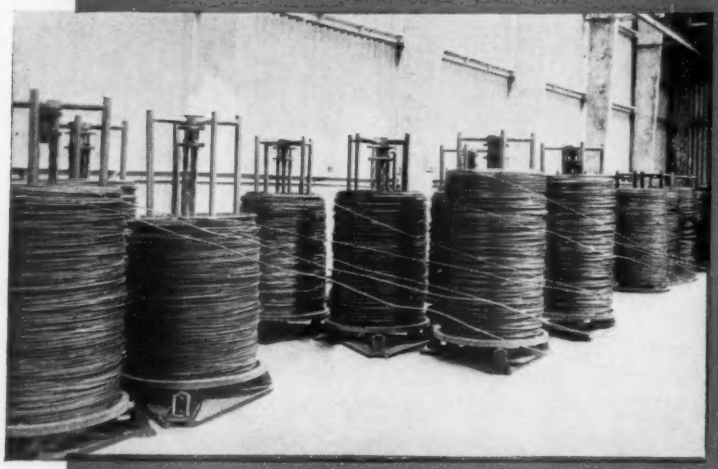
Farmer Norton Gravity blocks for handling large coil weights. These can be built for coils up to 2,000 lb or larger. The units can either draw or wind as required. Can be fitted with constant or variable speed motors. DO NOT TWIST THE WIRE. This is essential for Carbon Steel wire. Are built in block sizes from 36" to 12" diameter.



Five Double draft Gravity blocks drawing 15 cwt coils of mild steel wire 5.4 mm to 3.7 mm or Single Draft 5.4 mm to 4.4 mm. Drawing speeds 600 ft/min and 800 ft./min. All five of these blocks are operated by one man.

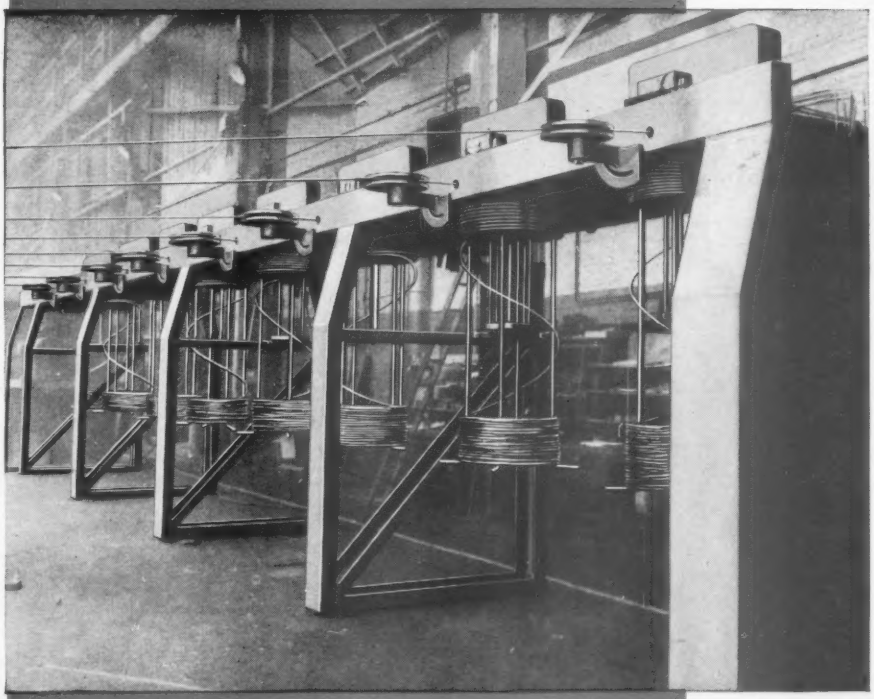


Large coils of this type drawn on Gravity blocks are ideal for feeding cutting machines, nail machines, patenting and galvanising furnaces etc.

SIR JAMES FARMER NORTON & CO. LTD.,

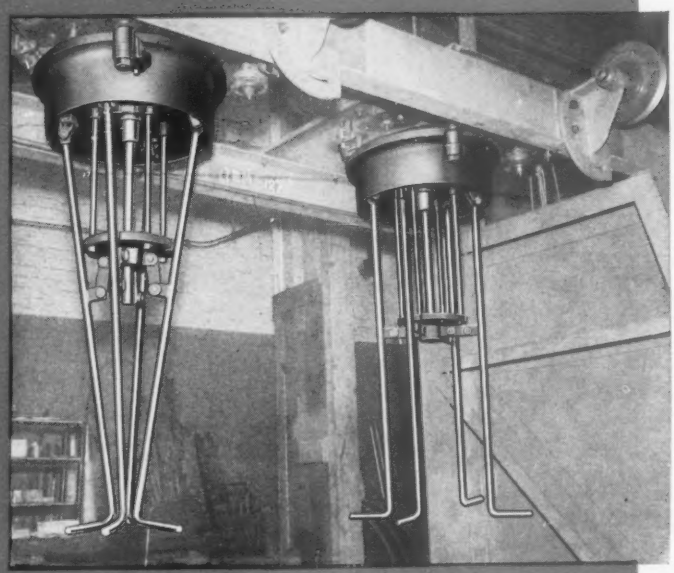
ADELPHI IRONWORKS, ADELPHI STREET, SALFORD 3, ENGLAND. Telephone BLAckfriars 3613/4/5

Agent: Steel & Wire Machinery Inc., 15457 Euclid Avenue, Cleveland 12, Ohio, U.S.A.



Eight head machine for collecting Galvanised wire 5mm - 1.6 mm. in 1,000 lb coils. Drive through variable speed oil gear to give winding speeds of 0 - 150 ft/min. For larger coils up to 2,000 lb a different design of wire collectors is used.

OVER 200 GRAVITY BLOCKS SUPPLIED TO OUR CUSTOMERS THROUGHOUT THE WORLD:—



In United Kingdom
Australia
India
Pakistan
France
Belgium

Orders are being executed for U.S.A.

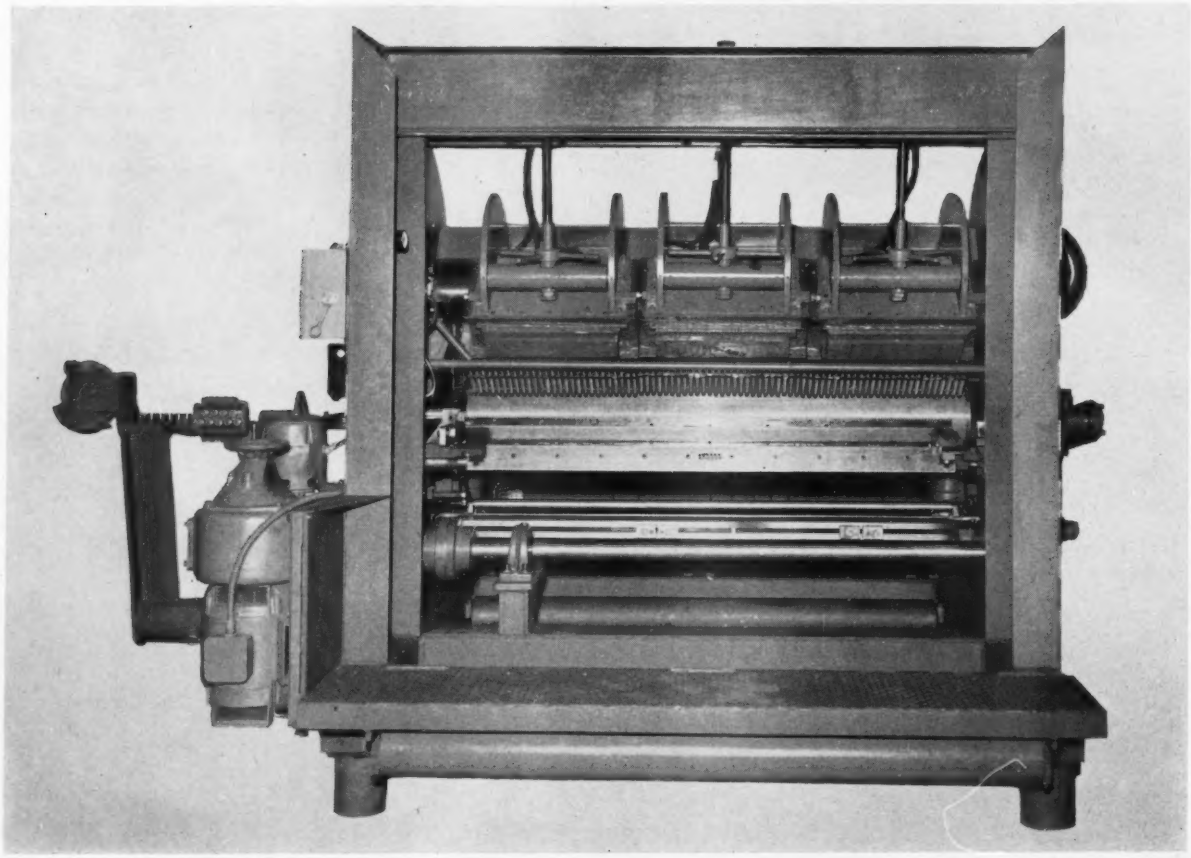
Take up frames for Galvanizing, tinning and heat treatment.

The strippers are collapsed pneumatically.

. . . who are the Inventors and Pioneers of this inverted system of drawing.

SOMMER

FAB-33 LIGHT WELDED FABRIC MACHINES



- Quick change from one mesh to another
- High speed operation
- Automatically and permanently timed
- Full electronic control — no relay
- Fully synchronous timer, phase shift heat control
- Three phase balanced load
- Low original cost, low maintenance cost
- Unit built minimum installation time
- Operating in ten steel mills across the country
- Custom and auxiliary equipment available to your specifications

Model FAB-33 Standard specifications:

Type of Fabric The standard fabric welder is completely equipped electrically and mechanically to produce mesh in the following sizes and spacings:

WIRE GAUGE	LINE SPACING	STAY SPACING
11½ ga. thru 12½ ga. galv.	1", 2", 4", 6" & 8"	1", 2", 4", 6" & 8"
13 " " 14½ " "	1", 2", 4", 6" & 8"	1", 2", 4", 6" & 8"
15 " " 16 " "	*½", 1", 2" & 4"	*½", 1" 2" & 4"

*** Square dies are required for ½" line wire spacing**

Galvanized welding quality wire commonly known as "open steel" is required for best results.

SOMMER PRODUCTS COMPANY

7100 S. ADAMS STREET **PEORIA, ILLINOIS**

Pioneers in wire welding since 1929.

Announcing the NEW HUD-PAK

HIGH SPEED WIRE PAYOFF PACKAGE

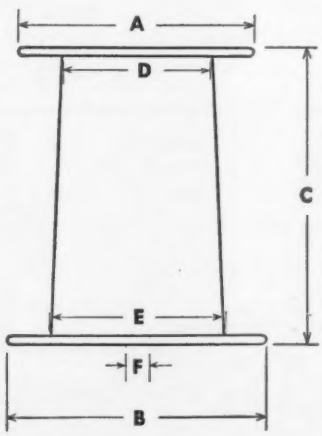
Are You Looking For High Quality Bare Or Coated Wire In The Most Modern Up-To-Date Package?

- High Speed Payoffs.
- Controlled Tensions For Single And Multiple End Winding Operations.
- Large Payoff Packages.
- A Rugged Container To Protect Wire In Use Or Storage.
- Instantaneous Starts And Stops.
- All At Regular Wire Prices.

The exclusive new HUD-PAK is the most important money-saving development in wire packaging in 20 years. With many conductor and AWG sizes, users report record payoff speeds in excess of 5000 feet a minute. HUD-PAK reduces waste from short spools. Its tapered barrel spool—and absence of inertia found with rotating spools—permit instantaneous starts and stops with no danger of wire shakedown and tangle.

We are currently supplying HUD-PAKS containing bare copper wire, tin plated, silver plated, and aluminum wire. Other types are being developed. Optimum results can be obtained within the size range of AWG 38 to AWG 24.

The term "HUD-PAK" is a trade-mark of Hudson Wire Company



	A	B	C	D	E	F
HUD-PAK 120	10"	11"	13½"	6½"	7½"	1¼"
HUD-PAK 50	8½"	9½"	9⅞"	6"	7"	1¼"

CAPACITIES

MATERIAL	Approx. Weight (lbs.)	
	120	50
COPPER	120	50
CADMIUM COPPER	120	50
ALUMINUM	37	16
BRASS 70/30	115	48
PHOSPHOR BRONZE	120	50
NICKEL SILVER	115	50
STEEL	107	44

HUDSON WIRE COMPANY
OSSINING DIVISION, OSSINING, NEW YORK / TELEPHONE: WILSON 1-8500

ANOTHER TALIDE CASE HISTORY . . .

Talide® Dies Cut Maintenance Costs at REVERE COPPER!

REVERE COPPER & BRASS, INC., ROME, NEW YORK, producers of copper clad, stainless steel kitchenware

found aluminum bronze dies gave better production than steel alloy dies, but maintenance costs still remained high. Over 500,000 one-quart sauce pan bodies were being drawn with each aluminum bronze die costing $250, but it cost another $900 to maintain the die in operation.

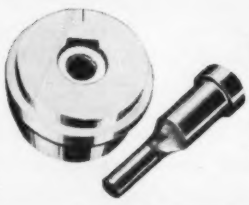
It was necessary to hand polish the die in the press every 2,000 pieces. After each 10,000 piece run, the die had to be taken to the tool room to have .010 to .030 of stock removed from face to clean up. Downtime and maintenance expense was costly.

A Talide die costing $1150 was installed and production now averages over 1,000,000 pieces with no visible wear. It was only necessary to hand polish the carbide die several times during the break-in period while drawing the first 30,000 pieces, with subsequent servicing negligible. More uniform, accurate-to-size parts are produced with scoring eliminated. No subsequent buffing operation on the piece part is required.

During the past 15-year period Revere Copper has installed over 30 Talide dies on their production line—pressing to shape a broad variety of kitchenware items, including sauce pans, covers, double boilers, percolators, handles, etc. Although millions of piece parts have been drawn to date, no Talide die has yet been worn out!

WIRE DIES

Hundreds of miles of steel and non-ferrous wire—.004 to .750—drawn through TALIDE dies.



COLD EXTRUSION DIES

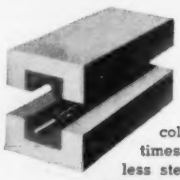
50 times more valves and tappets cold extruded with solid TALIDE punches and dies.

BLANKING AND FORMING DIES

70 times more paper discs blanked out with TALIDE—over hard alloy die.

CURLING ROLLERS

TALIDE curling rolls last 65 times longer than steel rolls on beverage can forming operation.



SWAGING DIES

Leading fountain pen manufacturer cold swages 33 times more stainless steel parts with TALIDE dies.

HEADING AND EXTRUSION DIES

Cold heading ¼" C-1008 rivets, TALIDE dies produced 11,200,000 pieces, other carbide dies only 3,500,000.

POWDERED METALLURGY DIES

Compacting highly abrasive chemical powders, TALIDE pill dies last 4 months; steel dies wore out in 6 hours.

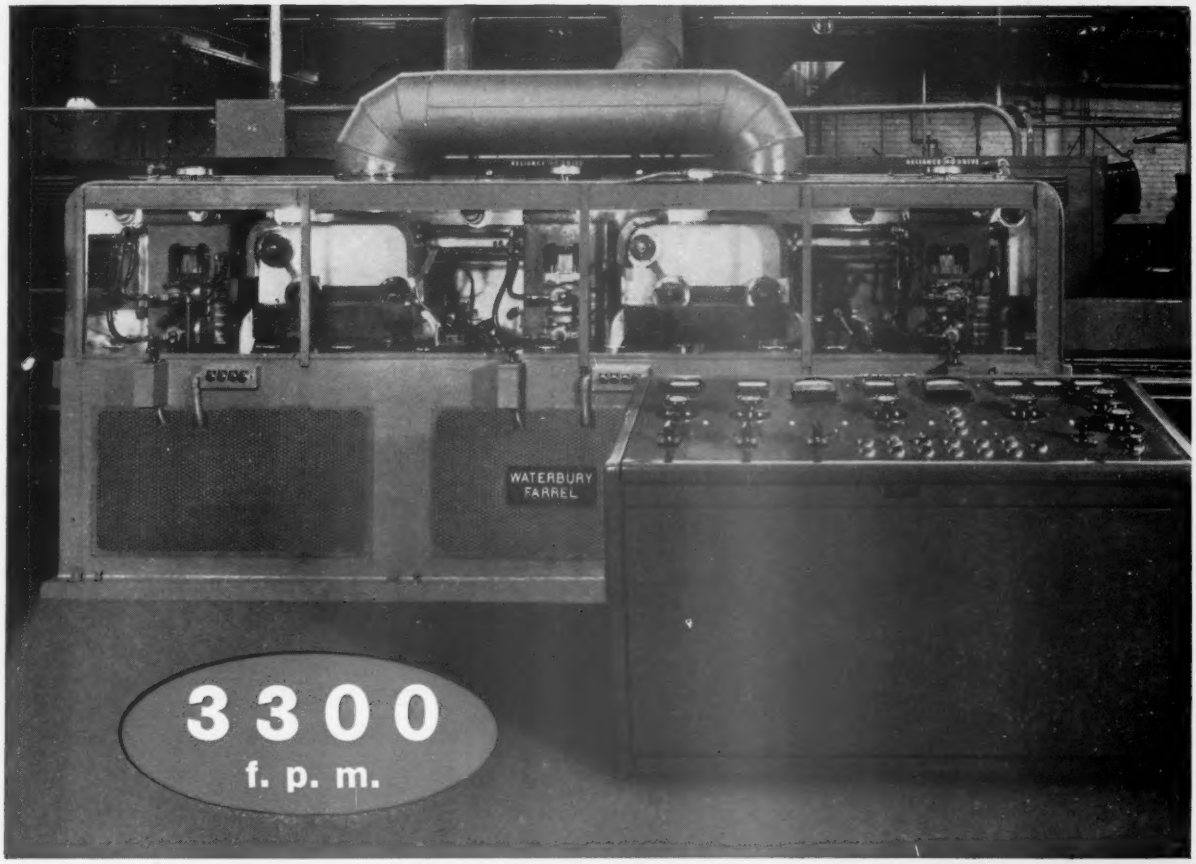
A Talide die engineer can help you cut costs and increase production on draw presses, punch presses, pill presses, cold headers, swagers and draw benches.

METAL CARBIDES CORP.
6001 Southern Boulevard
Youngstown 12, Ohio

Send for 68-Page Catalog 59-G

METAL CARBIDES CORPORATION
TALIDE®
YOUNGSTOWN 12, OHIO

HOT PRESSED AND SINTERED CARBIDES • VACUUM METALS
HEAVY METAL • ALUMINUM OXIDE • HI-TEMP. ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY



PRECISION *Wire Flattening* MILLS

THE WATERBURY FARREL 3-STAND TANDEM WIRE FLATTENING MILL, pictured above, is rolling close tolerance, high carbon steel wire at the Athenia Steel Div., National-Standard Co., Clifton, N. J., *at speeds up to 3300 feet per minute.* Tolerances are being held within 0.002" on width and 0.00025" on thickness of finished rectangular wire. Modern, cabinet type enclosure of the mill and its coolant troughs keeps the installation clean and facilitates the exhausting of fumes and evaporated coolant.

We invite you to contact us for your requirements in rolling mill equipment. In addition to Wire Flattening Mills, we design and build Sendzimir Cold Strip Mills, Two-High and Four-High Mills, Two-High/Four-High Combination Mills, Rod Mills, Special Mills, Gang Slitters, and Accessory and Auxiliary Equipment.

WATERBURY FOUNDED 1851 FARREL

THE WATERBURY FARREL FOUNDRY & MACHINE CO.

DIVISION OF TEXTRON INC.

Waterbury, Connecticut U. S. A.

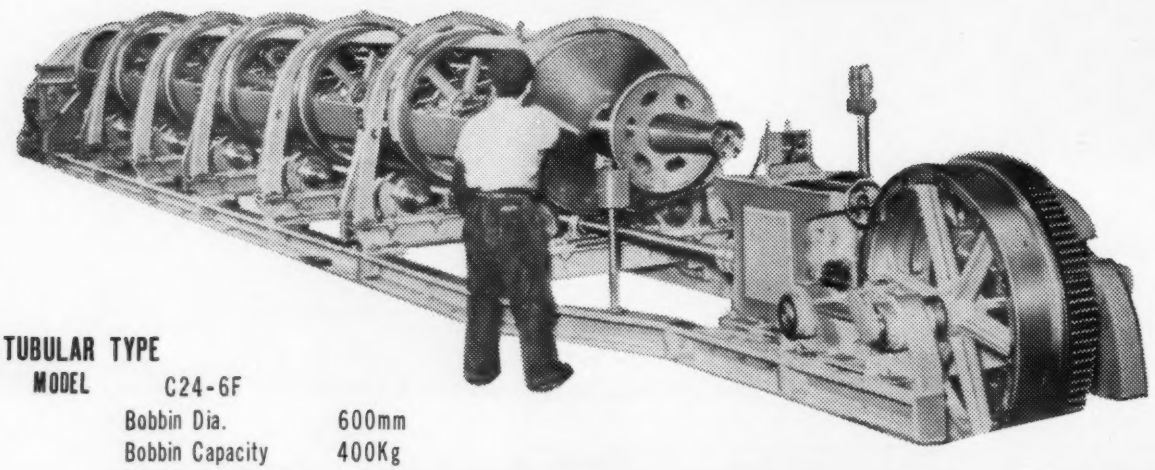
Sales Offices: Chicago • Cleveland • Los Angeles • Millburn, N. J.

WF-72

A name in your mind !

MIYAZAKI'S TUBULAR TYPE, PLANET TYPE

WIRE CLOSING MACHINE



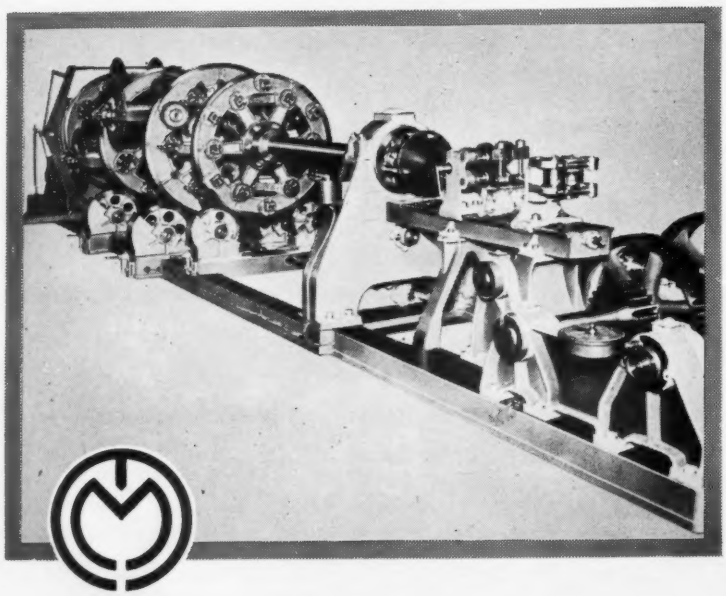
TUBULAR TYPE

MODEL C24-6F

Bobbin Dia.	600mm
Bobbin Capacity	400Kg
Number of Bobbins	6
Max. speed	350rpm

PLANET TYPE

MODEL 24" Bobbin × 6 Fliers
+ 12" Bobbin × 6 Fliers
for NIWRC WIRE ROPE



Both of them are equally equipped with the twist-back device of all fliers which are holding the supply bobbins.
All supply bobbins in the rotating body can be rotate themselves toward the decided direction(advance or back direction) at the decided ratio against one revolution of the rotating body.

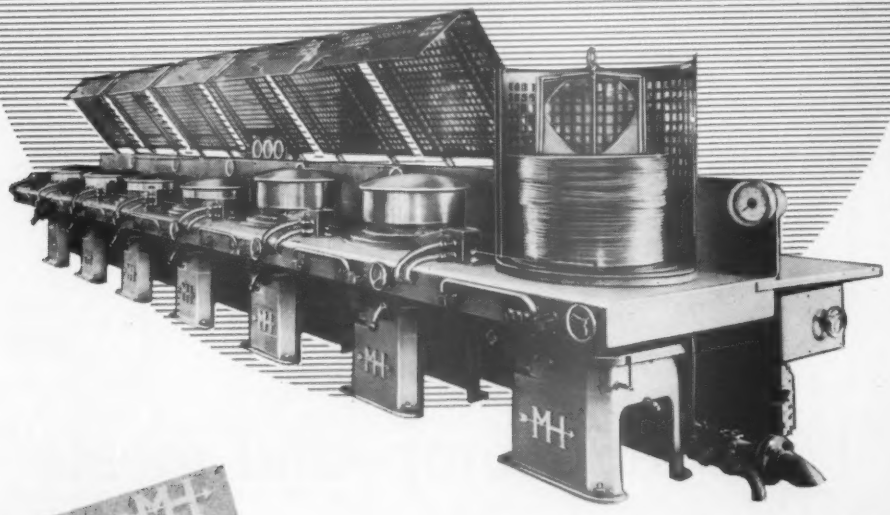
Miyazaki Iron Works, Ltd.

Kaizuka, Osaka, Japan.

THE BEELINE

PRECISION WITH RUGGEDNESS

Ten Block BEELINE DG-4 Designed to Draw 3/8" Aluminum or 5/16" Copper Rod at Finishing Speeds up to 4000 f.p.m.



Seven Block BEELINE DG-4 For Max. 5/16" High Carbon Steel Rod. Max. Finishing Speed 1300 f.p.m.

BEELINE Catalogue
Write for your copy.

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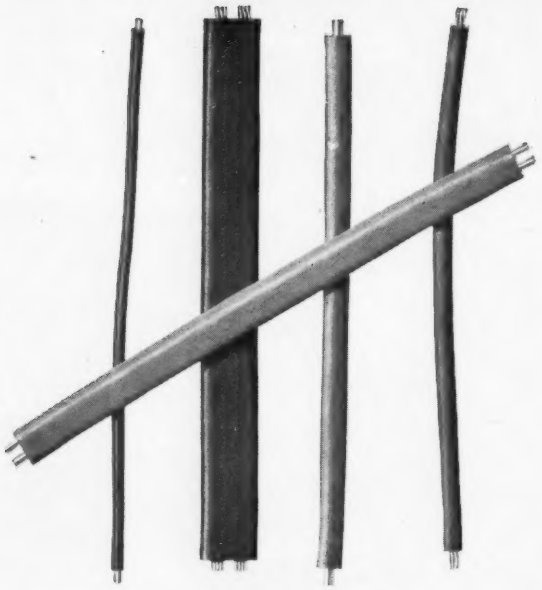
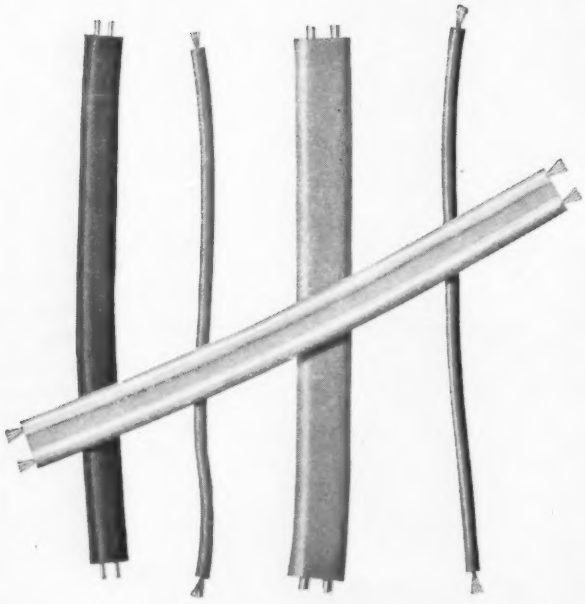
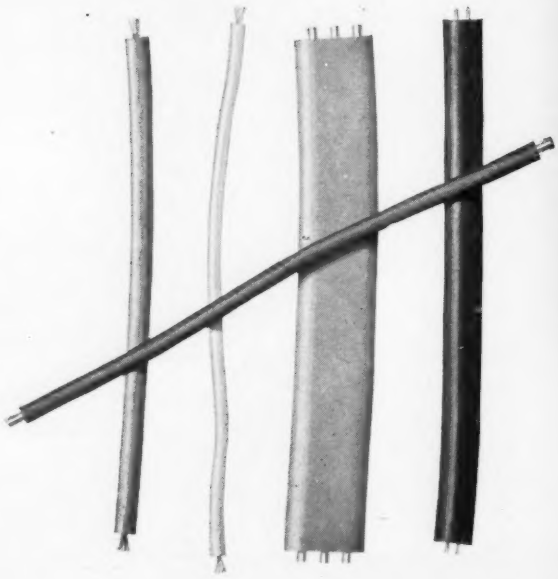
CABLE: Morgardshammar, Ludvika
Telephone: 0240-71100

U.S. OFFICE MH. MACHINES
19002 LOMOND BLVD.
CLEVELAND 22, OHIO
TELEPHONE: WYoming 1-5830

One for...







OPALON® 1038 vinyl compound meets 15 insulating and jacketing specifications*

Monsanto Opalon 1038 fills so many applications, it can streamline your inventory. It combines excellent extrudability, high insulating qualities, great heat resistance and toughness even after long use under rigorous conditions. If you need to meet any of the specifications listed below, write for 1038 data to Monsanto Chemical Company, Plastics Division, Room 752, Springfield 2, Mass.

Monsanto

MONSANTO DEVELOPER IN **PLASTICS**

***INSULATION**

U.L. T, TW, and 60° C. oil exposure on both copper and aluminum conductors.

U.L. underground feeder and non-metallic sheathed cable (UF-NMC).

Class 11, U.L. standard for flexible cord and fixture wire insulation and jacket.

IPCEA Appendix I.

ASTM D-734.

MIL-W-76A, Types LW, MW, and HW.

U.L. 80°C. appliance wire.

***JACKET**

ASTM D-1047 (Passes -40° C. cold bend).

UF-NMC.

REA Spec. PE-14.

IPCEA, Appendix J.

IMSA, Spec. 19 and 20.

Inside-outside telephone cable (Staple Gun Wire).

Jan-C-17A Type I.

MIL-C-15479A (Harbor Defense).

"KEYSTONE WIRE made this part possible" at International Screw Company

flowability IS THE SECRET

KEYSTONE COLD HEADING WIRE STUDY

International Screw Company, Detroit, Michigan, manufactures a special weld stud fastener for one of the 1961 automobile models. The combination large head, deep collar and weld points required unusual flowability.

This weld stud now is formed in an extreme double blow with no head or collar cracking. Keystone Cold Heading Wire fills the dies completely giving sharp, clean edges . . . long die life and trouble-free production runs. Of this, W. C. Nelson, President of International Screw says, "Keystone Wire made heading this part possible."

Here is another case where Keystone Cold Heading Wire and its flowability characteristics solved a difficult forming problem. May we suggest you, too, try Keystone Wire for difficult cold heading jobs, and for ordinary ones, too!

A Keystone Wire Specialist will gladly discuss your wire forming problems with you and make recommendations. Call him at an early date and let him show you how Keystone Flowability can help you, too.

Keystone Steel and Wire Company, Peoria, Illinois

KEYSTONE

WIRE FOR INDUSTRY

MANUFACTURED AT PEORIA, ILLINOIS, U. S. A.

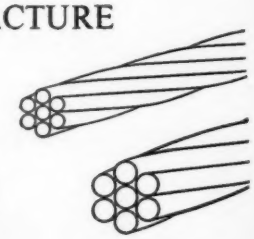
LARGE STRANDS

for prestressed concrete

❀ ❀ ❀

WE ALSO MANUFACTURE

SMALL STRANDS



and plain, indented or crimped wires

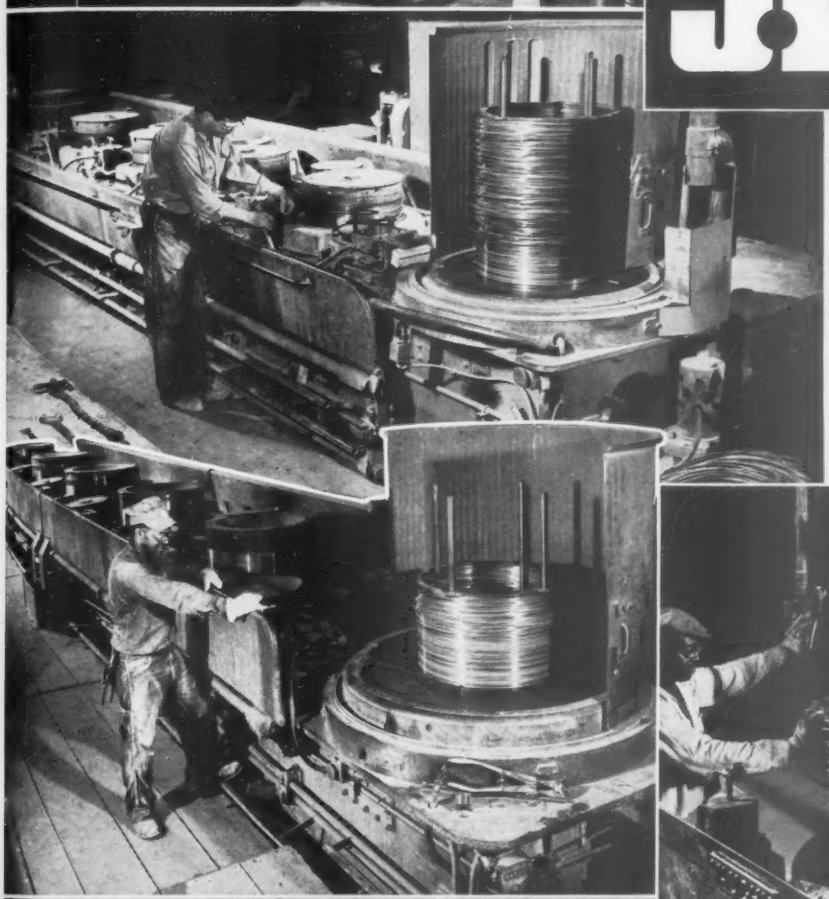
RYLANDS

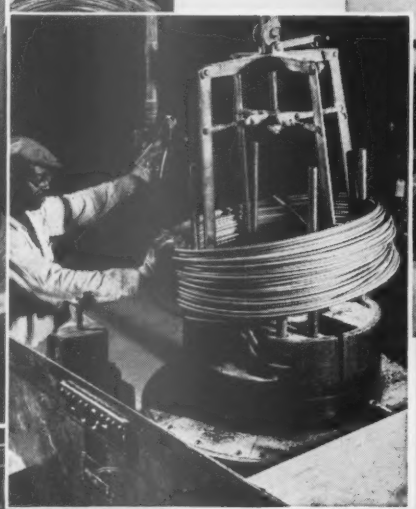
Brothers Limited

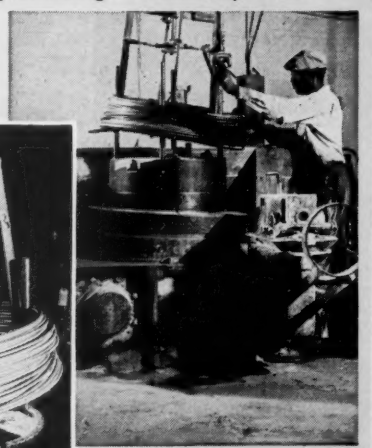
WARRINGTON
ENGLAND

VAUGHN® at Aliquippa

MODERN EQUIPMENT FOR FINER AND FASTER WIRE PRODUCTION







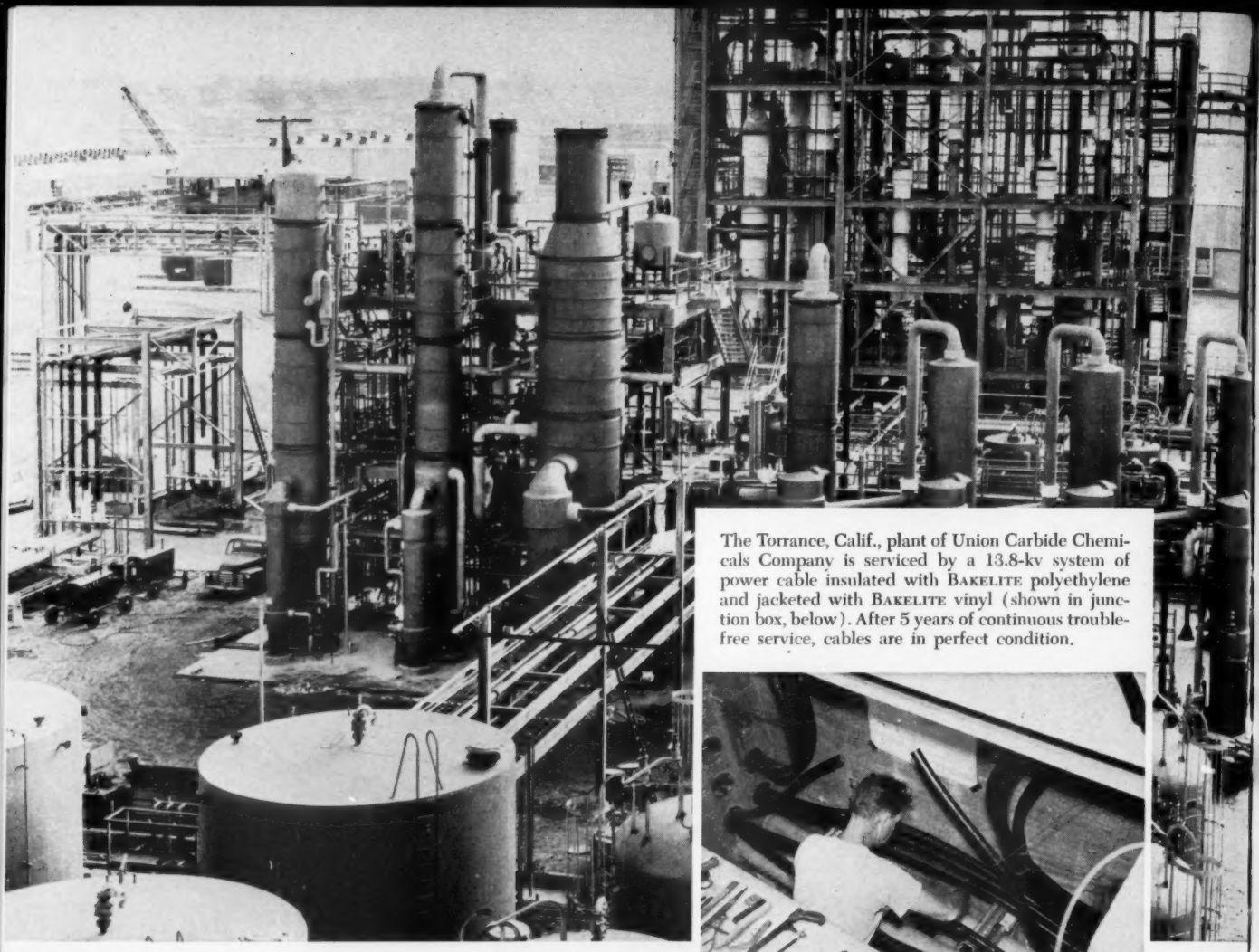
Typical of J & L modernization at the Aliquippa plant are the many Vaughn wire drawing machines installed at that location over the past 5 years. These Vaughn units bring the latest advances in speed, safety and operating ease to the production of top quality J & L wire—joining the ranks of dependable Vaughn equipment at Aliquippa performing so faithfully over the years.

"Quick on the Draw!"

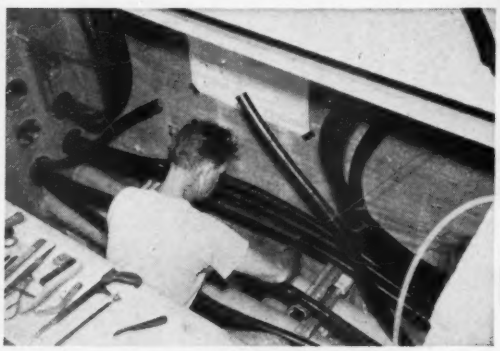
The VAUGHN MACHINERY COMPANY

Cuyahoga Falls, Ohio, U. S. A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.



The Torrance, Calif., plant of Union Carbide Chemicals Company is serviced by a 13.8-kv system of power cable insulated with BAKELITE polyethylene and jacketed with BAKELITE vinyl (shown in junction box, below). After 5 years of continuous trouble-free service, cables are in perfect condition.



Polyethylene-insulated, vinyl-jacketed power cable

STILL GIVING UNINTERRUPTED SERVICE AFTER 5 YEARS

In November 1955, an entire 13.8-kv system of single-conductor underground cable insulated with BAKELITE polyethylene and jacketed with BAKELITE vinyl was first energized at the Torrance, California plant of Union Carbide Chemicals Company. Although exposed to the environmental hazards of moisture, electrolysis, chemical spillage and high temperature, there have been no indications of insulation or jacketing breakdown or deterioration. Moreover, all 74,600 feet of this installation have operated without fault of *any* type.

The fine performance record of BAKELITE Brand plastics as insulation and jacketing for this high-voltage power installation is assurance of its suitability for similar power applications. Whether the requirements include exceptional physical toughness, low dielectric loss, low-temperature flexibility, resistance to deformation, weathering or chemicals . . . over an extended period of time, there's a BAKELITE polyethylene or vinyl to assure a dependable, uninterrupted flow of power.

Electrical utilities, electrical contractors and engineers, and cable manufacturers . . . all can benefit from the wide selection of BAKELITE high- and low-density polyethylene and vinyl materials specifically designed for insulation and jacketing. For more information about these materials, write Dept. GT-160, Union Carbide Plastics Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. *In Canada:* Union Carbide Canada Limited, Toronto 12.

Cable for this installation supplied by: Anaconda Wire & Cable Co., New York 4, N. Y. and Rome Cable, Division of Alcoa, Rome, N. Y.

UNION CARBIDE

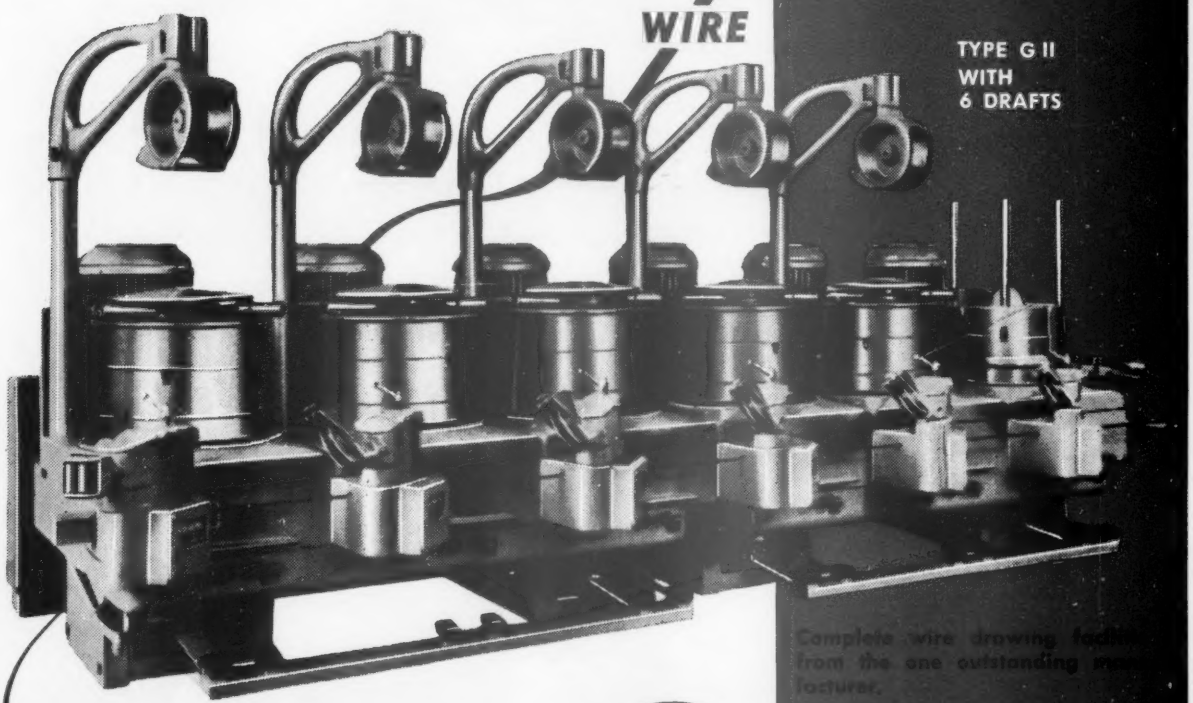
BAKELITE and UNION CARBIDE are registered trade marks of Union Carbide Corporation.

HERBORN

WIRE DRAWING MACHINES

NON-SLIP MULTIPLE OPERATION

FOR BASIC and CARBON STEEL WIRE



TYPE G II
WITH
6 DRAFTS

This is the Herborn Type G II non-slip multiple wire drawing machine with 5 drawing blocks 18" diameter and a finishing block of 20" or 24" diameter.

- *Each block has individual motor and drive with 2, 3 or 6 speeds.*
- *Water-cooled system, for blocks and die holders*
- *Precision ground helical teeth gears for smooth running.*
- *Smooth, slow-starting arrangement over a transformer.*
- *Emergency stop system, plus other safety features.*
- *The machine can be constructed as six separate, individual units which can be operated as single blocks, or in tandem as a 6 block unit.*

Complete wire drawing facilities from the one outstanding manufacturer.

Economical Operation—More quality features than any other machine at twice the price.

Pay for themselves quickly through increased production, elimination of downtime, and superior products at lower cost.

For complete information, write to:

HERBORN MACHINERY CORP.

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Maschinenfabrik Herborn - Berkenhoff & Drebes A.-G.

Herborn/Dillkreis (Germany)

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Steel Wire Rods
Everywhere

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Tel: 1-0463
Cable Address:
YAWATASTEEL
DUESSELDORF

AMERICAN OFFICE:
Room 2009,
Seagram Building
375 Park Ave., New York
22, N.Y., U.S.A.
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YAWATAISCO NEWYORK

You charge the resin as received when you produce polyethylene-covered wire

because polyethylene needs no blending

Manufacturing polyethylene-covered line wire is simple. You feed the resin, as you receive it, to the extruder. There are no plasticizers, softeners, antioxidants to add. There's no prebatching, blending, milling; no vulcanizing after extrusion. Carbon black and antioxidants are already in the resin.

A complete polyethylene production program simplifies operations in other ways too. One production line can take the place of several, providing savings in equipment, floor space, maintenance and labor. Stocking only one material reduces purchasing and inventory problems.

With polyethylene, you base production on a material that has trended downward in price as capacity increased. And ample capacity for PETROTHENE® polyethylene insures continuous supplies of uniformly high-quality resin.

Look To Tomorrow's Sales

See how polyethylene can improve the profitability of your operations tomorrow, if not today. With other insulating costs trending upward, polyethylene can be expected to be your most profitable line wire coating in the years to come. You can prepare for those profits *by promoting polyethylene-covered line wire now*, just as U.S.I. is doing in a series of advertisements in utility magazines.

For your customers, polyethylene means a product that is easy to handle . . . has exceptional weather and stress-crack resistance . . . is long-lasting in service. This tough plastic covering is registering outstanding service records for power cable, communications cable, WD-1 infantry field wire, TV lead wire and many other applications.

U.S.I. PETROTHENE polyethylene resins are tailored to provide the proper balance of properties needed in different end uses. To help you choose the most suitable resin for each use, we've compiled a chart of the properties, applications and applicable specifications of PETROTHENE polyethylene compounds. This information is in a new four-page data sheet, "PETROTHENE Resins for the Wire and Cable Industry." Also available is U.S.I.'s comprehensive 100-page "PETROTHENE Polyethylene . . . A Processing Guide." Write for your copies.

U. S. Industrial Chemicals Co.
Division of National Distillers and Chemical Corp.
99 Park Ave., New York 16, N. Y.

Please send me:

☐ "PETROTHENE Resins for the Wire and Cable Industry"
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U.S.I. INDUSTRIAL CHEMICALS CO.
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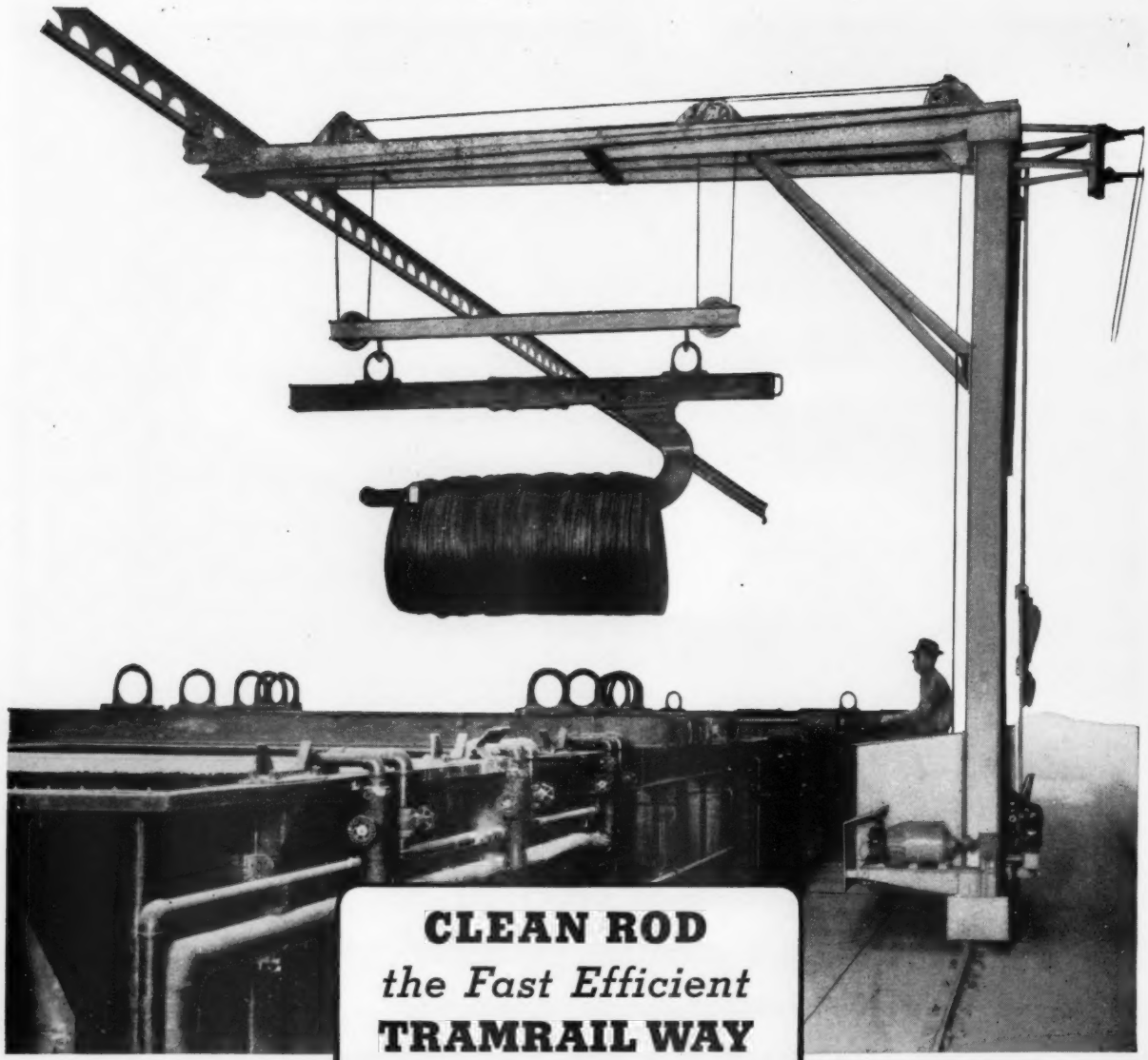

CLEAN ROD
the Fast Efficient
TRAMRAIL WAY

With a Cleveland Tramrail Cleaning House Gantry Crane a cleaning house can be organized to secure the advantages of straight line production efficiency. This cuts space required, enforces cleanliness and better working conditions. Of prime importance it speeds production and brings down costs tremendously.

All operations—acid bath, rinse, lime dip, bake—can be handled by one man, and of significance, far greater tonnage can be cleaned per day than by customary methods.

Let us give you the facts about many successful cleaning house installations.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

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THE CLEVELAND CRANE & ENGINEERING CO.
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OVERHEAD MATERIALS HANDLING EQUIPMENT

NEW DEVELOPMENTS CONTINUE!

Large Continuous Electric Annealer VG 85 to be worked in combination with any copper rod breakdown machine, for bright annealed finished wire for sizes between .14" and .045". Finishing Speeds up to 3000 to 4000 ft/min.

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EXCLUSIVE REPRESENTATIVES FOR U.S.A. AND CANADA

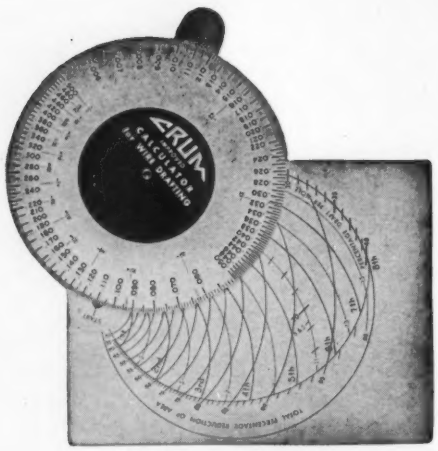
NIEHOFF MACHINE WORKS

SCHWABACH NEAR NURNBERG WESTERN GERMANY

SAVE SET-UP TIME WITH THE...

CRUM CALCULATOR
FOR WIRE DRAFTING

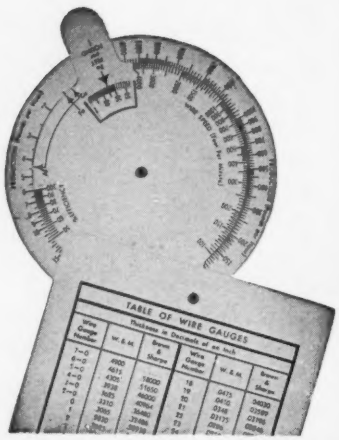
Useful and Accurate!



Front view of Crum Calculator

THIS NEW DOUBLE-PURPOSE CALCULATOR WILL:

1. **Provide quicker and more accurate information on die sizes and reduction areas;**
2. **Calculate wire production rates for various speeds and efficiencies.**



Reverse view of Crum Calculator

SOME OTHER FEATURES OF THE CALCULATOR

- Has new scale for more accurate determination of small percentages.
- Gives readings in B & S gauges.
- Intermediate lines provide reductions for 16 holes in one setting.
- New rectangular shaped back for better protection of calculator.
- More legible % draft-per-hole scale.
- Vinyl plastic construction, resistant to wear, warping, dirt, perspiration, wire drawing soaps—can be cleaned.
- Still fits your vest pocket.
- Handy tables of W & M and B & S gauges.
- Feet per pound calculating scale for steel, copper and aluminum wires.
- Durable, accurate, easy to use.

The improved Crum Calculator is worth its weight in gold in time saving—no laborious mathematical calculations necessary when you use it. Instruction sheet with examples accompany each Calculator. You should have one or more in your wire drawing department.

THE PRICE: $5.00 EACH

Send your orders to:

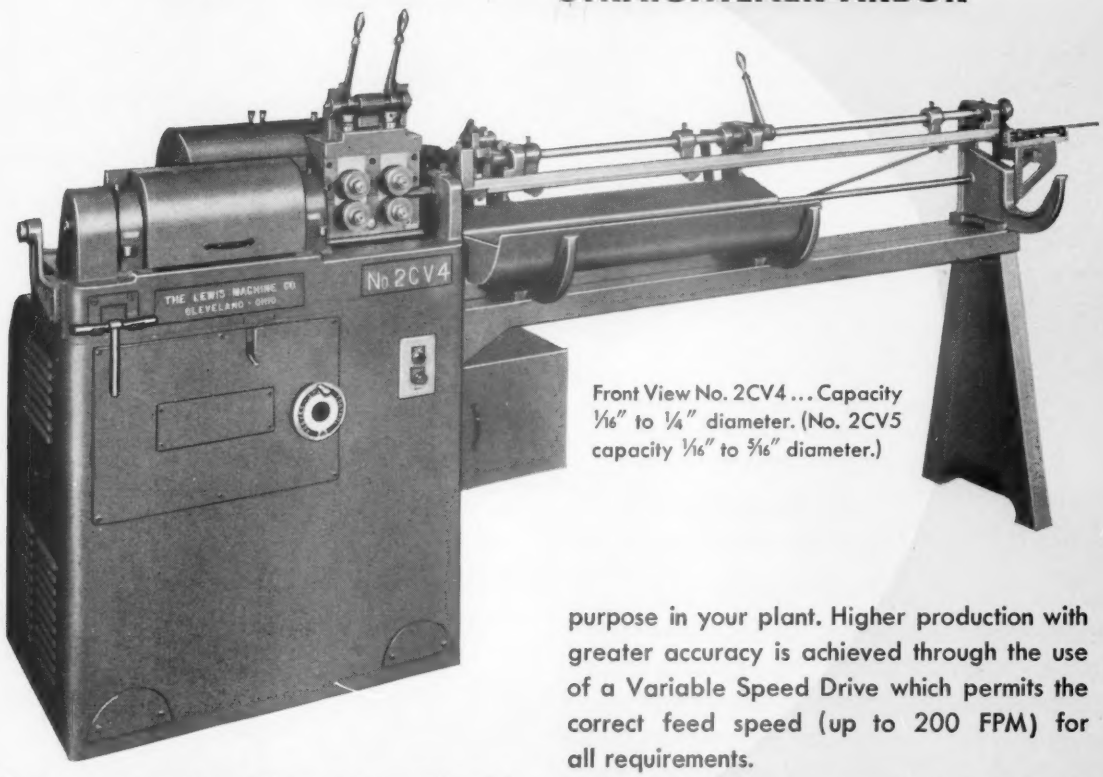
WIRE AND WIRE PRODUCTS

453 MAIN STREET **STAMFORD, CONN.**

(Exclusive distributors)

THE NEW LEWIS *Convertible*

AUTOMATIC WIRE STRAIGHTENING AND CUTTING MACHINES WITH VARIABLE SPEED DRIVE AND DUAL-CENTER STRAIGHTENER ARBOR



Front View No. 2CV4 ... Capacity 1/16" to 1/4" diameter. (No. 2CV5 capacity 1/16" to 5/16" diameter.)

* The new Lewis No. 2CV series is equipped with our Dual-Center Rotary Straightener Arbor and can be quickly converted to handle shapes by installing our interchangeable Roll Straightener.

This convertible feature introduces a new flexibility in wire straightening and cutting operations ... one machine can serve a double purpose in your plant. Higher production with greater accuracy is achieved through the use of a Variable Speed Drive which permits the correct feed speed (up to 200 FPM) for all requirements.

The outstanding feature of this series is the DUAL-CENTER STRAIGHTENER ARBOR (Pat. Pending) for round wire. This feature increases the range of the machine and makes it possible to precision straighten small diameters below the capacity of other machines.

Other models available to handle .012" to 1" diameter, as well as shapes.

THE LEWIS MACHINE COMPANY

3441 East 76th Street • Cleveland 27, Ohio • A Division of Curtis Mfg. Co.

Quality plus economy when you buy SUMITOMO steel wire rods

Rapid developments in the wire-product field have increased industry's demand for top-quality steel wire rods. Because of its international reputation for reliability, Sumitomo Metal supplies world markets — America in particular — with 7,000 tons of wire rods every month. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.

Dimensions of Sumitomo Wire Rods

Diameter 5mm. (13/64″) — 16mm. (5/8″)

Weight Single Bundle
about 270 kgs. — 320 kgs.
600 lbs. — 700 lbs.
Compressed Bundle (6 coils)
about 1,620 kgs. — 1,920 kgs.
3,600 lbs. — 4,200 lbs.

Coil Dimensions on Request

LEADING PRODUCERS OF STEEL WIRE RODS, PIPE AND ROLLING STOCK PARTS

SUMITOMO METAL INDUSTRIES, LTD.

Head Office: Osaka, Japan
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METTLER

ANNOUNCES

THIS BRAND NEW

HIGH SPEED

SHUSTER

Model 1V18

⅛" CAPACITY

DOLLAR SAVER

COMPARE ! !

PRICE

PRODUCTION

and PROFIT

SHUSTER

MODEL 1V18

WIRE STRAIGHTENING AND CUTTING MACHINE
VARIABLE SPEED ELECTRICALLY CONTROLLED

The Production Booster with infinite variable speed control and The New Electro Mechanical Positive Release Target

Illustrated is the new 1V18 SHUSTER AUTOMATIC WIRE STRAIGHTENING and CUT-OFF MACHINE. Many new features are included as Standard Equipment on these High Speed ⅛" capacity machines.

Features include: High Speed Straightening Arbor with elongated split dies for proper bearing surface and optimum straightening speed, new Shuster Electro-mechanical positive release target, with electrically controlled tripping mechanism to instantaneously operate roll type clutch. Feed roll housing and fly wheel are Timken bearing equipped. All mechanisms are mounted on Shuster Welded Steel Base. Also included are new improved Guide Bar, Guide Bar Cover and a new Angled Control Panel together with properly engineered working height.

There are more SHUSTERS in use throughout the world than all other machines of its type.

200 CUTS PER MINUTE

CAPACITIES 1V18

.062 to .125 basic wire

25 to 150 F.P.M.

Production:

Lengths up to 8"
200 pieces per minute

SINCE 1866

SHUSTER

Wire Straightening and Cut-off Machines and Components are built in 49 models from .020" to 11/16" Mettler Machine Tool also manufactures the SHUSTER 5/16" capacity. Thread Rolling Machines

SEE IT IN OPERATION
AT THE CHICAGO WIRE CONVENTION

METTLER MACHINE TOOL, INC.

Boulevard Industrial Park
New Haven, Conn.

YOUR ADVERTISING IN THE 1961

BUYERS' GUIDE

CLOSING DATE FOR ADVERTISING: FEBRUARY 20

CLOSING DATE FOR PRODUCT LISTINGS: JANUARY 20

1. Send us your changes in product listings, corporate names and addresses promptly. The 1961 Edition of the WIRE AND WIRE PRODUCTS BUYERS' GUIDE now is being edited. Any and all changes should be in our hands before January 20. Your early response will help us to keep the directory up-to-date and *will benefit your business.*

YOUR ADVERTISING

2. It is important, too, to you, your customers and your prospective customers that your listings be REINFORCED WITH ADVERTISING.

The BUYERS' GUIDE is a widely used reference book, used by wire mills, product fabricators, and others in the industry to locate sources of rod, wire, machinery, supplies, etc., when they are in the market to buy. Ad rates are modest.

By providing information on your products, you greatly assist your customers and prospective customers to determine that what you have to sell will fill their needs. It helps to influence sales and in many instances results in direct orders to advertisers.

The WIRE AND WIRE PRODUCTS BUYERS' GUIDE is the only directory in this country published exclusively for the Wire Industry. It is more complete than any other source of supply for this great industry.

SEND US YOUR ORDER NOW.
IF YOU DO NOT HAVE THEM,
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J. EDWARD DONNELLAN, Vice Pres.

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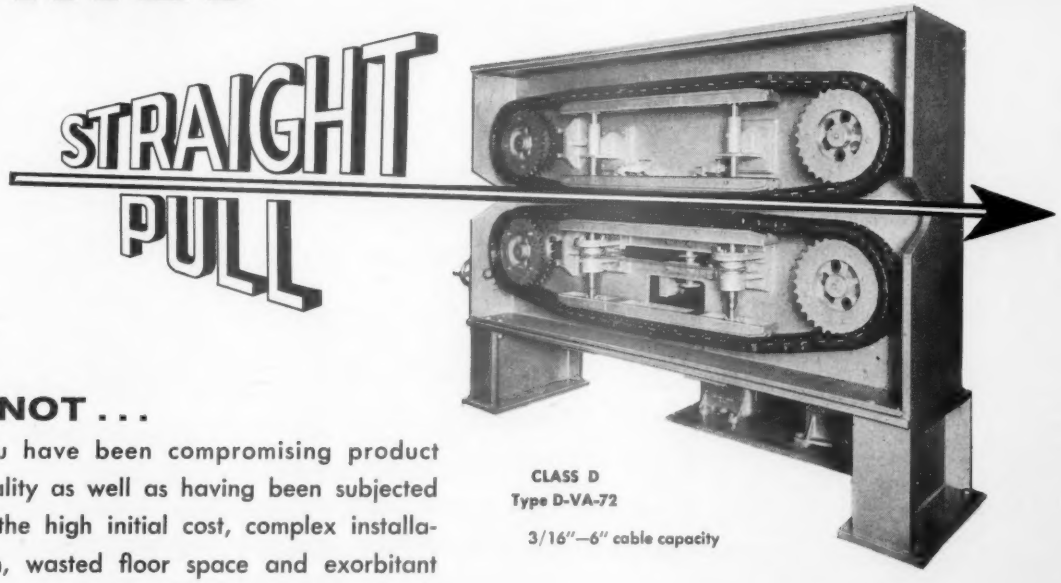
Telephone: DAvis 3-0482

HAVE YOU TRIED

STRAIGHT PULL



CLASS D
Type D-VA-72
3/16"—6" cable capacity

IF NOT . . .

You have been compromising product quality as well as having been subjected to the high initial cost, complex installation, wasted floor space and exorbitant power requirements inherent to drum type capstans.

FOR YOUR NEW INSULATING LINE . . . CONSIDER

CATERPULLER* *by ENTWISTLE*

It is notable that Caterpuller, including drive, costs less and requires no special pit or foundation. In addition to these savings, undue flexing of cables is eliminated, while heavier pulls are possible with less horsepower.

The D-VA-72 Caterpuller, pictured above, is a prime example of the many fine types of Caterpullers by ENTWISTLE covering a wide range of applications. Without obligation, write for Specification No. 16.

*TRADEMARK

ENTWISTLE
Manufacturing Corporation
1475 ELMWOOD AVE., PROVIDENCE 7, RHODE ISLAND
Over 40 years of dependable service
Formerly James L. Entwistle Co.

Europe, South America, Mexico
FOREL EQUIPMENT CORPORATION
165 Broadway, New York 6, N. Y.

British Associates
THE KEMSON ENGINEERING CO., LTD.
Wellington Mill, Bolton Road
Blackburn, Lancs., England

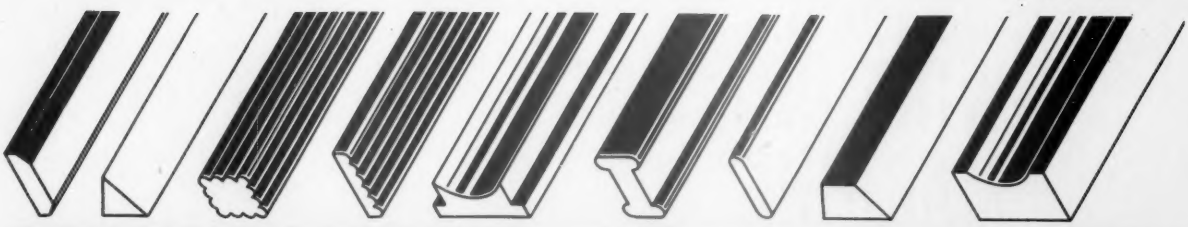
Greetings of the Season

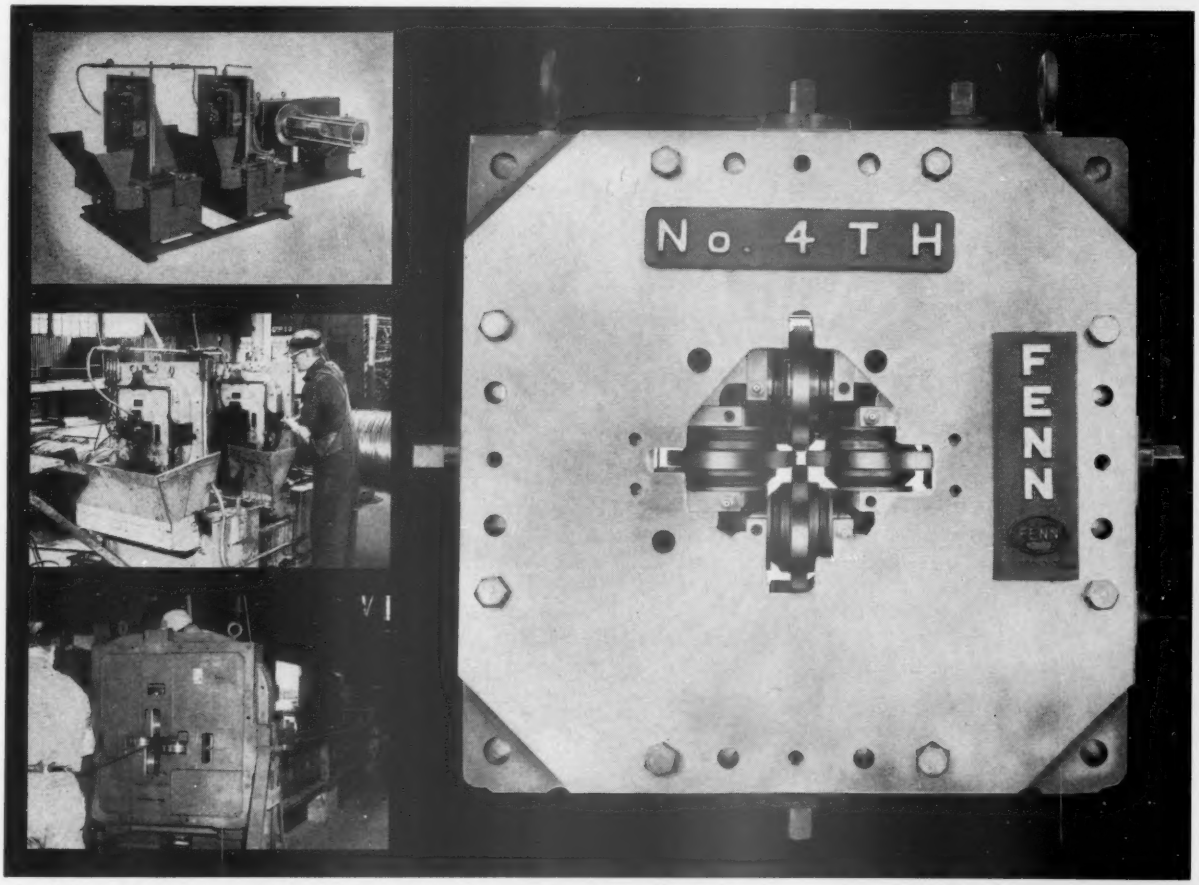
The Officers and Directors of the WIRE ASSOCIATION extend a most cordial greeting and their good wishes to all their friends at home and abroad in the Wire Industry.

The Staff of WIRE AND WIRE PRODUCTS also take this opportunity to express their good will toward and appreciation of all those with whom they have been privileged to work during the past year — this embraces our readers, those who have written articles and papers for us and those numbered among our good advertisers.

We all join in expressing the wish that every one with whom we are associated in operating the Association and in publishing Wire and Wire Products will enjoy good health and a full measure of prosperity in the coming year.

Richard E. Brown, Publisher

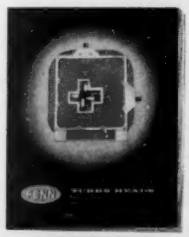




Top and Center — *Wire Shaping Mills with tandem Turks Heads.* Bottom — *Turks Head with Draw Bench.* Right — *Fenn Combination Type Turks Head.*

Wire Shaping with FENN Turks Heads

Fenn has pioneered the development of the Turks Head to their present day wide usage for precision production wire shaping. Used on the Wire Shaping Mill (developed by Fenn), on draw benches, or in tandem with Rolling Mills, Fenn Turks Heads produce many precision shapes, both plain and special, such as shown above, with both ferrous and nonferrous wire and rod. They aid in size control, and impart a fine surface finish. Fenn manufactures a complete line in plain, universal, combination and triangular types with bearing capacities at 100 RPM up to 56,400 pounds for heavy reductions. Fenn also makes the important accessories, such as capstans and take-up reels. If it's a wire-shaping problem or requirement, chances are Fenn can help you. Fenn's central engineering department and field engineers are ready to assist you. A copy of the Turks Heads Catalog No. TH56 will be promptly sent upon request.

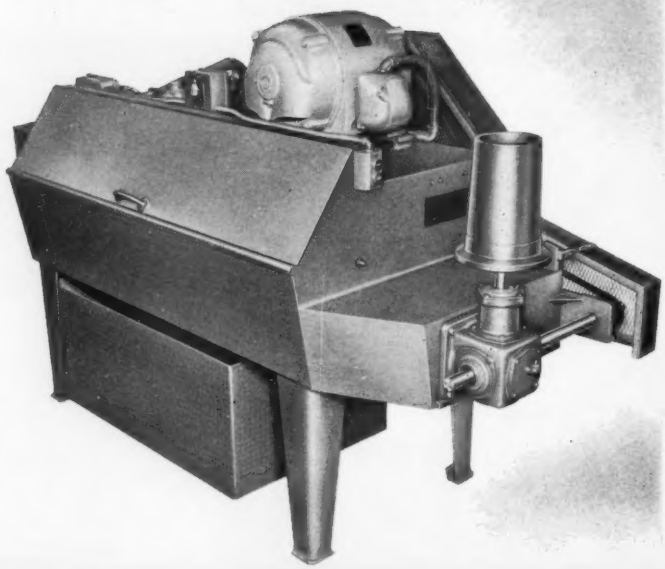


The Fenn Manufacturing Company, Newington, Conn.

FOUR ROLL TANDEM

WIRE DRAWING MACHINE

Step Rolls
Silent Chain Drive
Fabricated Frame
Circulating Cooling System



ROLLS

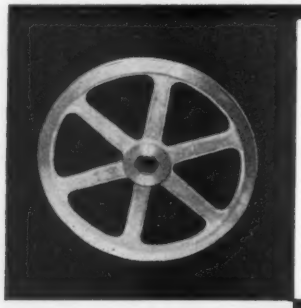
6-step 12-pass style, 12 inches major diameter. Machined Meehanite for good wear resistance and long operating life. Rolls are specially designed and driven so that slippage of the wire on the rolls due to wire elongation is a minimum.

FRAME

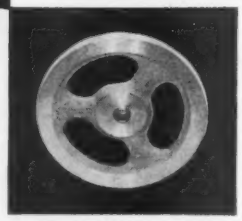
Extra heavy construction for good rigidity. All-welded fabrication of ½-inch and ¾-inch steel plate.

MAIN DRIVE MOTOR

10 to 30 horsepower, 220 or 440 volts, depending upon size and speed of wire to be drawn. Variable speed or geared motor. Belt or chain drive.



ALUMINUM SHEAVES



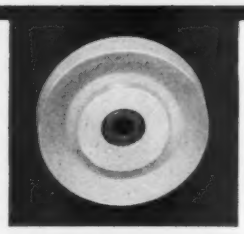
These Watkins Aluminum Sheaves offer outstanding advantages of ease of maintenance and long service life when used in gangs to guide wire through enamelling ovens and related equipments. Each sheave is machined from an aluminum casting.

	SMALL	LARGE
V-GROOVE ROOT DIA.	3¾"	8"
SHAFT SIZE	¼"-5/16"-⅜"	⅝"
WIDTH	¼"	3/16"
SHAFT MOUNTING	Oiled bushing	Needle bearing

Large sheave is available with single or double groove.

NYLON

IDLER PULLEY



The Watkins Nylon Idler Pulley combines the resiliency, high strength and low weight of nylon with the free-turning ball bearing to give outstanding performance wherever pulleys are used in fine wire drawing machinery.

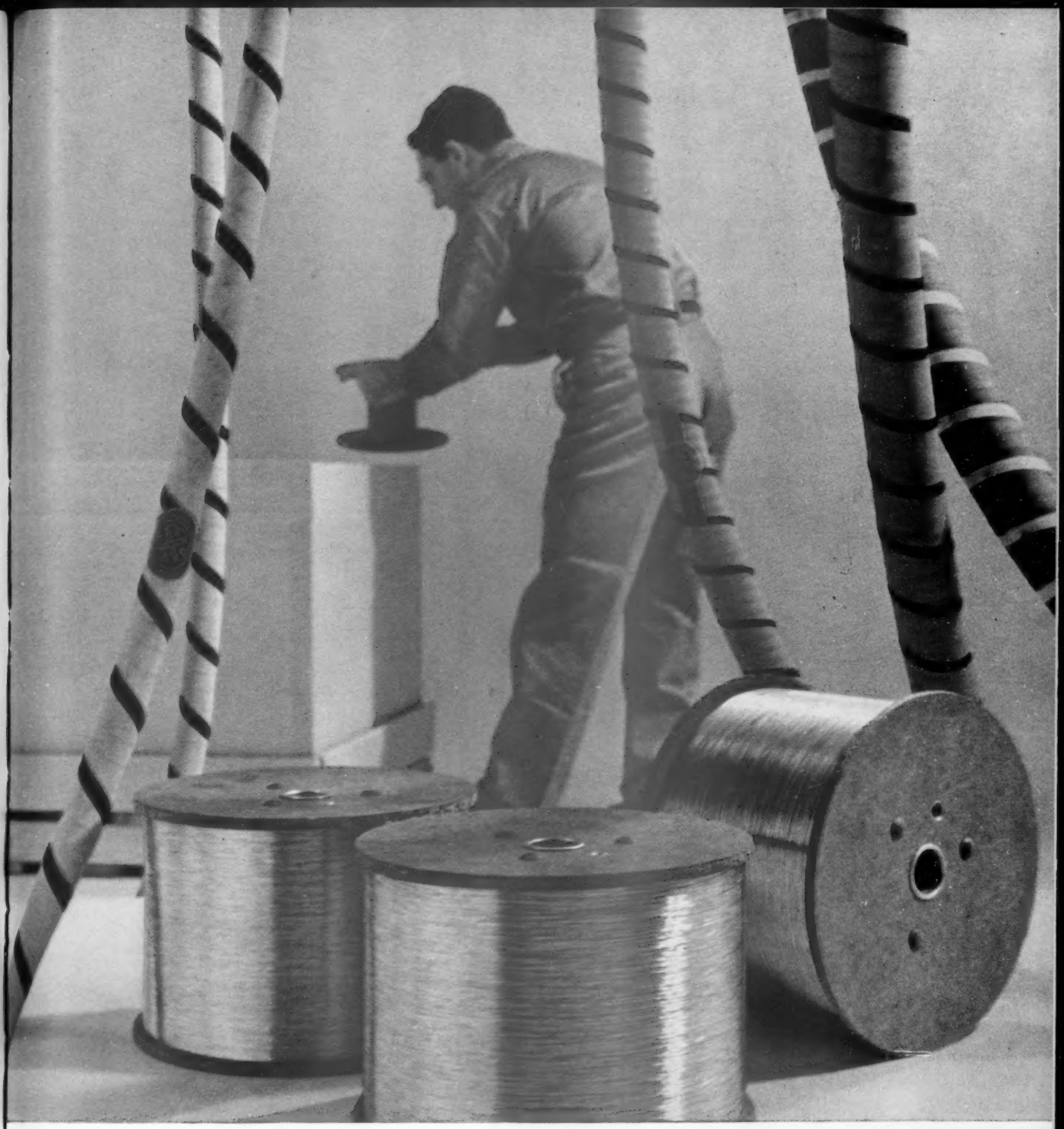
SIZE:
1½" O.D. x 3/16" Wide
SHAFT SIZE:
3/16" Diameter
STYLE:
Single groove
Double groove

Other styles available to suit individual application.

RS WIRE MACHINES

Descriptive literature is available. Inquiries are invited.

R. S. WATKINS & SONS, INC. Glen Road, Sandy Hook, Conn.



Roebling Hose Reinforcing Wire... The best things come in no-charge packages

When you buy Roebling Hose Reinforcing Wire it is delivered to you on no-charge spools that mean savings to you.

This modern method of packaging does away completely with deposits and the bookkeeping involved; it contributes, too, to lower freight costs and saves storage space. Thus, you avail yourself of a precision-made and quality controlled product, without any handling, shipping and inventory inconveniences.

Roebling Hose Reinforcing Wire, used for braiding reinforcement, is produced in a complete range of sizes. Write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey, for details.

Roebling . . . Your Product is better for it

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

BY
AUTOMATICALLY
FORMING & WELDING

Eliminating multiple machine operations, and the high cost of parts handling and change-over

---

13 SIZES OF THESE
HEAVY-DUTY
HOSE CLAMPS

In a high-volume, high-precision process at Cuyahoga Products Corp., with a flexibility permitting rapid shifts from one part-run to another

---

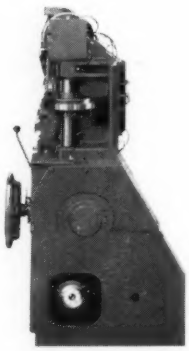
PRODUCTION TIME
HAS BEEN
CUT IN HALF

Production has been increased 50%. Easy accessibility and maintainability of tools has reduced down time

---

AND PROFITS
ARE BEING
MULTIPLIED

With no strain, and with the sweet click, click, click of profits



WITH THE VERSATILE
NEW TORRINGTON V-82
VERTICAL 4-SLIDE

Secondary operations such as the Cuyahoga hose clamp welding can only be done with such high production on a vertical 4-slide. For the complete story of this new production machine, write —

THE TORRINGTON MANUFACTURING COMPANY
MACHINE DIVISION • Torrington, Connecticut

Home for Christmas

Season's Greetings

DAVIS - STANDARD

DIVISION OF FRANKLIN RESEARCH AND DEVELOPMENT CORPORATION

MYSTIC, CONNECTICUT

LOOKING FOR A FASTER AND MORE ECONOMICAL WAY...

TO FORM COMPLICATED WIRE & RIBBON METAL PARTS

NILSON 4 SLIDES
NILSON FOURSLIDE
DESIGN & TOOLING HANDBOOK
Wire and Ribbon Metal Forming FOURSLIDE Machines
THE A. H. NILSON MACHINE COMPANY
800 Bridgeport Avenue
Shelton, Connecticut, U.S.A.

If you are looking, it will pay you to investigate NILSON Fourslide Forming Machines, which can handle wire diameters from 0.010" to 0.5" (feed lengths to 32") and ribbon stock up to 4" wide (feed lengths to 24"). And, parts can be produced at rates over 400 per minute.

NOW—NILSON'S NEW "FOURSLIDE DESIGN AND TOOLING HANDBOOK" is available.

For the first time, a NEW—"FOURSLIDE Design & Tooling Handbook" explains many important aspects of the FOURSLIDE PROCESS. It will help you in product design, in methods engineering, and in tooling. The HANDBOOK describes design aspects of parts formed on a FOURSLIDE; Drawings and descriptions of tooling design using actual examples; How to combine operations, such as stamping and forming, cut-off, forming and welding, or forming and assembly. Many other facts also given.

We invite you to write today for your free NILSON "FOURSLIDE DESIGN & TOOLING HANDBOOK". You will also receive the new NILSON Bulletin No. 62 covering the widest range of FOURSLIDES available—17 models.

NILSON

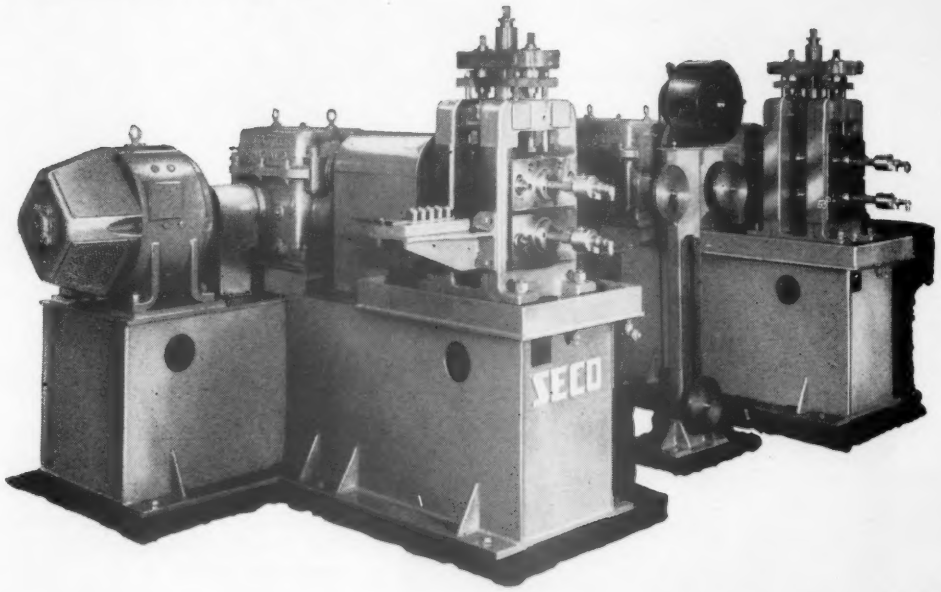
A. H. Nilson Machine Company

625 Bridgeport Avenue Shelton, Connecticut Telephone: WAverly 9-1433

Predictable Performance

is yours when you change to

SECO WIRE FLATTENING MILLS



Acceptable and predictable performance "on both sides of the fence" when Seco Wire Flattening Mills are used in your operation.

Seco's staff of trained engineers . . . specialists in solving production problems . . . are available for personal assistance to you. Call us today.

SECO

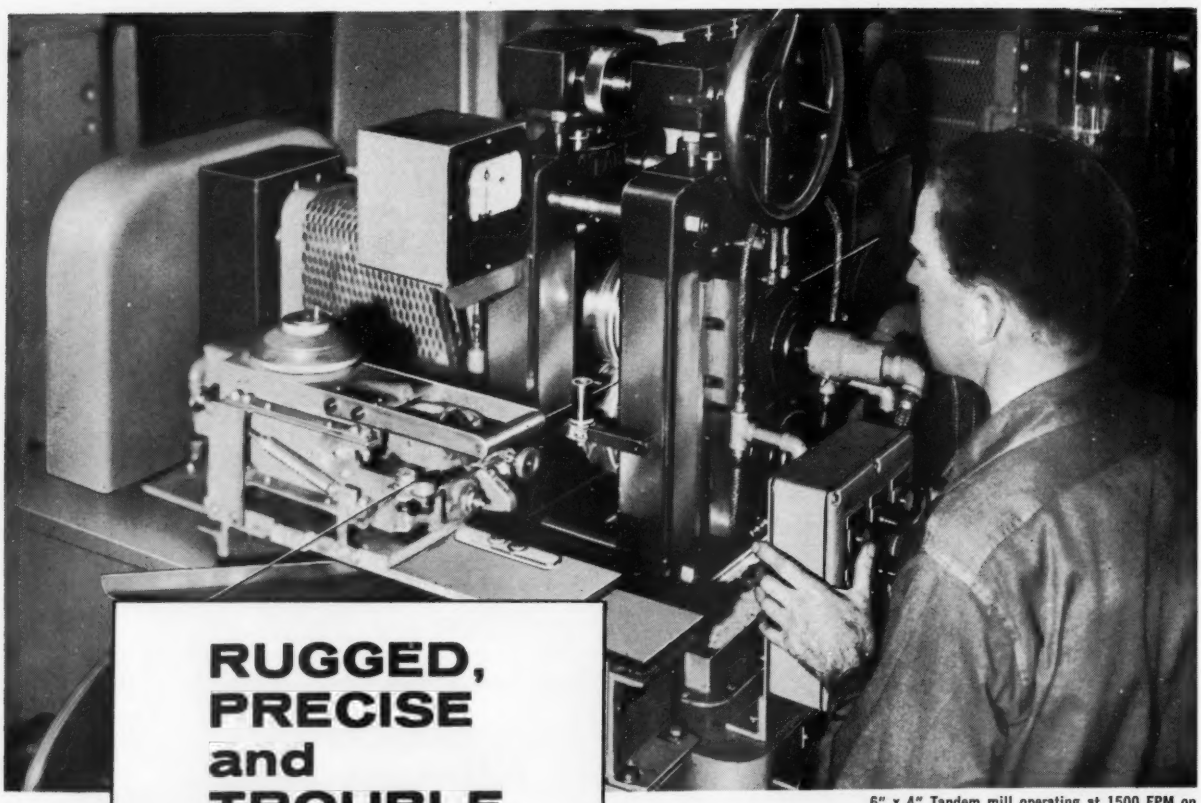
SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

STEEL EQUIPMENT COMPANY

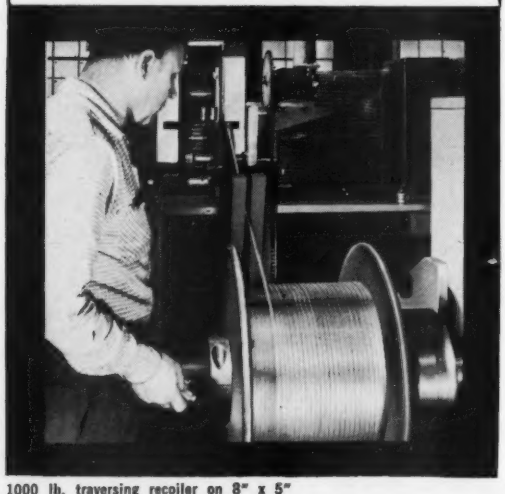
P. O. BOX 737, WARRENSVILLE STATION • CLEVELAND 22, OHIO

AFFILIATED WITH *Lee Wilson* ENGINEERING CO., INC.



6" x 4" Tandem mill operating at 1500 FPM on high carbon steel at Page Steel Division—ACCO.

RUGGED, PRECISE and TROUBLE FREE



1000 lb. traversing recoiler on 8" x 5" tandem line at Kagan Dixon Wire Corp.

STANAT WIRE FLATTENING MILLS

Stanat mills are designed to consistently give you extremely close tolerances combined with high speed production.

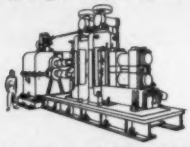
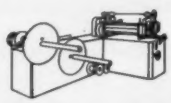
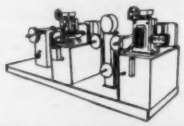
Simplicity of design insures minimum maintenance and frequently permits one man operation.

All Stanat mills include such quality features as completely enclosed permanently lubricated worm gear screwdowns; fully adjustable traversing recoiler; herringbone drive; anti-friction bearings at all critical wear points.

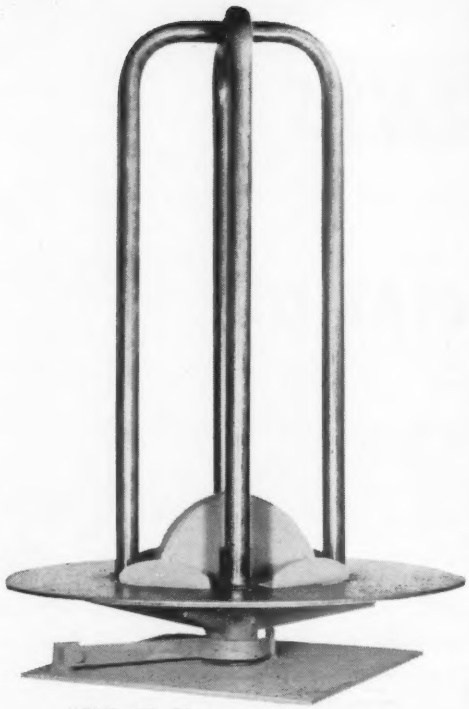
Stanat single and tandem wire flattening mills are available in sizes up to 10" roll diameter either as completely self-contained package units or as individual components for erection at your plant.

STANAT
MANUFACTURING CO., INC.

500 SHAMES DRIVE WESTBURY, L. I., N.Y.
IN EUROPE: STANAT-MANN, ESSEX, ENGLAND

MFR'S OF ROLLING MILLS, GANG SLITTERS, WIRE FLATTENING MILLS, ROLLER LEVELERS AND BULL BLOCKS



MODEL NO. 26
WIRE CARRIER MOUNTED ON PAY-OFF REEL

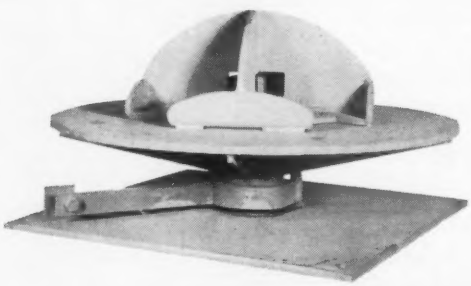
WORKING WONDERS WITH WIRE:

How to reduce changeovers, handling, down-time, scrap-ends 4 to 10 times!

Leading wire producers and fabricators across the country use (and recommend)

NORTHERN INDIANA STEEL'S
HIGH CAPACITY, HEAVY DUTY

WIRE CARRIERS and PAY-OFF REELS



MODEL NO. 26
PAY-OFF REEL

Let us know exactly what your operating needs are. If we don't already have the wire carriers and pay-off reels in stock, we're ready to make up your order as per your exact specification. In any case, we'll be pleased to quote you promptly in the quantities you specify.

They feed more smoothly

Handle 2000# to 4000# coils

Stack and store easily

And—They're Designed and Produced To *Your* Specifications

Northern Indiana Steel Supply Co., Inc.

Fabricating Division, Michigan City, Indiana
TELEPHONE TRiangle 4-3241

COMING EVENTS

OF

THE WIRE ASSOCIATION

April 26, 1961 — Meeting of the Board of Directors at the Sheraton-Atlantic Hotel, New York, N. Y., at 10:00 a.m.

The Electric Wire and Cable Management Committee will meet at 4:00 p.m. on this date.

April 27 and 28, 1961 — Regional Meeting of the Electric Wire and Cable Section, Sheraton-Atlantic Hotel, New York, N. Y. A plant visit to Bell Telephone Laboratories in Murray Hill, N. J., has been arranged.

June 22 and 23, 1961 — West Coast Regional Meeting of The Wire Association at the Jack Tar Hotel in San Francisco, California, with a plant inspection tour of Bethlehem Steel Company's wire mill in South San Francisco.

October 23-26, 1961 — Annual Convention of The Wire Association at French Lick, Indiana, with the French Lick-Sheraton Hotel as headquarters.

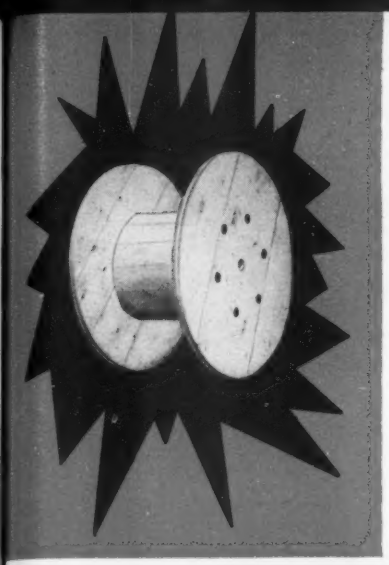
October 22-25, 1962 — Annual Convention of The Wire Association at the Lord Baltimore Hotel, Baltimore, Maryland. Plant visits to Bethlehem Steel Company at Sparrows Point and to Western Electric Company's Point Breeze works will be made.

Members are asked to note these dates on their calendars and are invited to make any advance inquiries desired on these coming meetings.

THE WIRE ASSOCIATION

Richard E. Brown, Executive Secretary

453 Main Street **Stamford, Conn.**



YOU SAVE WITH NON-RETURNABLES

BRIDGE REELS, through manufacturing techniques that have been continuously improved and streamlined, have become pre-eminently the standard for quality and dependability.

Look at these Advantages:

- Reduced Reel Investment
- Less Storage Space
- Lower Freight Costs
- No Return Freight Charges
- No Bookkeeping
- No Repair Costs
- No Deposits Needed
- No More Headaches! !

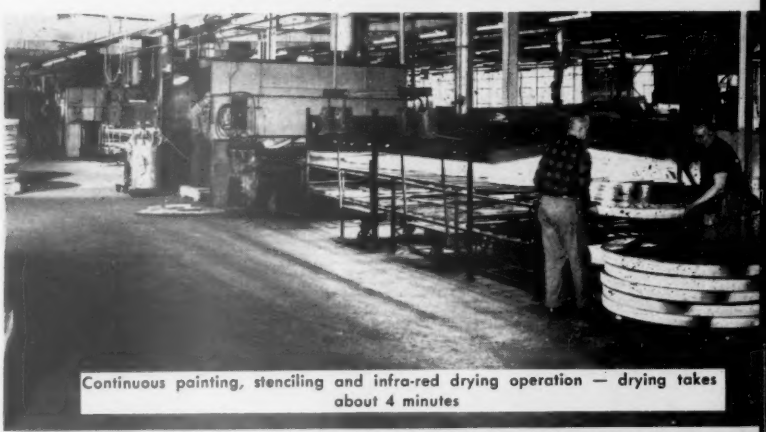
Start of production line for reel flanges.

Why BRIDGE REELS are Tops:

- Lumber Kiln Dried at Plant
- Latest and Finest Reel Manufacturing machines —many made to Bridge Special Specifications
- Fabricating methods continuously improved
- Fast, Efficient Straight-Line Flow of Production Work
- Painting and Stenciling Completed in approximately 4 Minutes
- Reel Assemblies made with many unique Mechanical Innovations
- Shipping and Delivery Facilities Unequaled

NON-RETURNABLE

WOOD REELS IN ALL SIZES FOR ALL TYPES OF ELECTRIC WIRE AND CABLE



Continuous painting, stenciling and infra-red drying operation — drying takes about 4 minutes

Small reel bench assembly and loading area.

NON-RETURNABLE REELS GIVE YOU A DEFINITE PACKAGING COST

Production line band sawing and multiple boring.

"REEL" GOOD —

Let us quote on your Reel needs. Send in your specifications. Better yet, visit our plant and see how Reels are made so well at so low a cost.

WOOD REELS

HIGH-SPEED SHIPPING SERVICE IN OUR OWN TRUCKS WITHIN A RADIUS OF 250 MILES OF THE PLANT, FAST FREIGHT WILL BRING YOU BRIDGE REELS WITHIN A FEW DAYS TO POINTS EAST OF THE MISSISSIPPI.

TEL: THOMPSONVILLE, CONN.
Riverview 9-8308

COULTER & McKENZIE

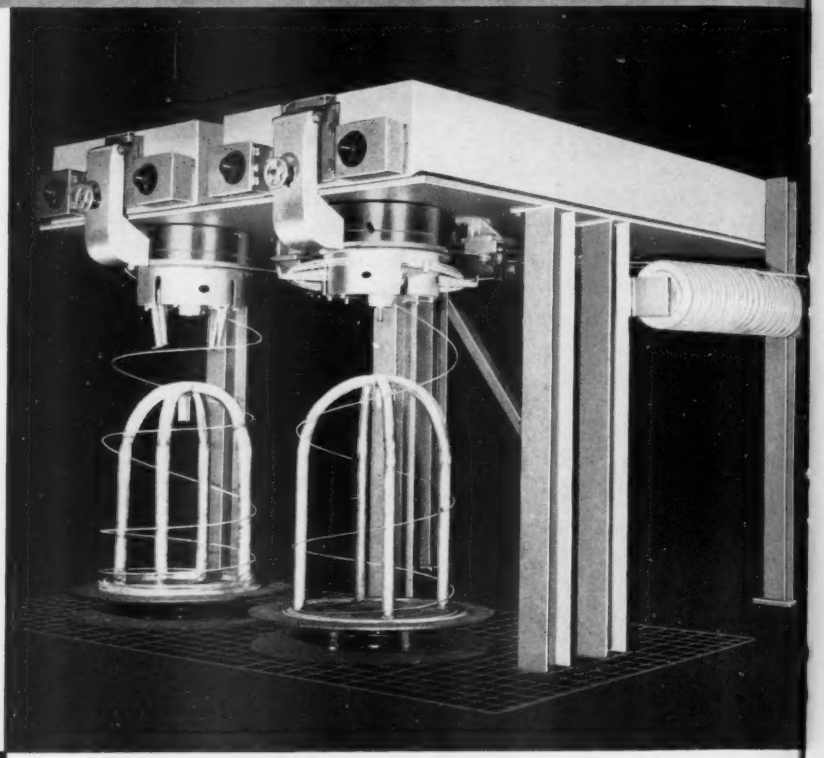
ANNOUNCES THE WIRE INDUSTRY'S MOST VERSATILE TAKE-UP & WIRE PACKAGING MACHINE!

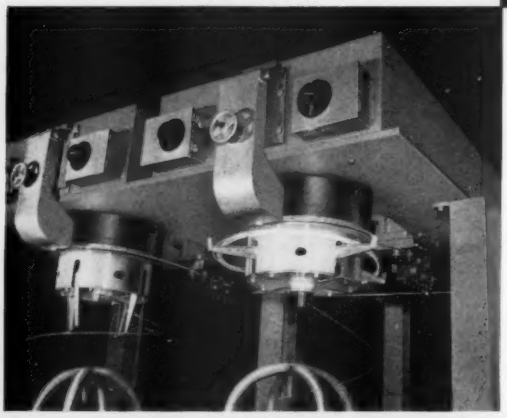
Vari-Coil

For PATENTING
ANNEALING
GALVANIZING
ENAMELING
TINNING
FINAL DRAW

- √ Non-Stop Package Changing
- √ Package Sizes to 4,000 lbs.
- √ Coil Diameters to 36″
- √ Speeds Infinitely Variable
- √ Wire Size to ⅜″ (.375″)
- √ Ferrous and Non-Ferrous Materials Including High Carbon Steel

THERE IS A SIZE FOR ALL APPLICATIONS. SINGLE OR MULTIPLE UNITS FOR YOUR INDIVIDUAL JOB.





For information concerning your application, please write or telephone.

1 INFINITELY VARIABLE RANGE OF COIL SIZES
a. All sizes wire from same capstan.
b. Current models with coil ranges 16″ to 26″ and 24″ to 36″ without changing blocks.
c. Coil sizes may be altered without stopping.

2 GREATER COIL WEIGHTS
a. Turn tables accommodate coils, drum paks and stems (200 to 1200 lbs.)
b. Oversize loads on handling pallets (1000 to 4000 lbs.)

3 INCREASED RANGE OF WIRE AND ROD SIZES
a. Precise cast control of fine wire to coarse rod.
b. No axial twist.

4 ACCUMULATOR HEAD PROVIDES INTERVAL FOR STRIPPING AT OPERATOR'S CONVENIENCE
a. Accumulator operating in conjunction with main take-up block is key to uninterrupted constant speed take-up.
b. Operator has 5 to 10 minutes accumulation time for stripping finished package from turn table.

This equipment manufactured under one of the following U. S. Patents 2,732,060; 2,868,474; 2,844,416; 2,868,268 or others pending.

Barron & Crowther Ltd., Eastleigh, Hants, England. European Draw-Pak Licensee Idos Industries Ltd., Royston, Herts, England, Sales Agents.

35 UNION AVENUE
TELEPHONE EDISON 5-1101
LIEBER'S CODE "MACKENZIE"
THE COULTER & McKENZIE MACHINE CO., INC.
BRIDGEPORT 7 CONNECTICUT, U. S. A.
INCORPORATED 1881

The Wire Outlook

Election results now are history. There clearly is no mandate for radicalism, but gird yourselves for inflation, higher taxes, more government controls and lower standards of living. These will not be effected immediately, just as they were not when we entered into the New Deal era, although they are likely to become evident in the years ahead, if the all-things-to-all-men campaign promises are fulfilled. Free enterprise has suffered a severe set-back.

Seldom have there been so varied opinions on the state of the nation — whether or not we are in the midst of a recession. In an election year business is traditionally poor. The recently elected president continually shouted from the housetops that the country was going to the dogs, which definitely created many doubts in the minds of the uninformed and in itself had a depressing effect. True it is that the gross national product had declined, but is reported to be only by one-half of one percent.

On the other hand, consumers have set records for both spending and saving. Taxes paid in 1960 have been at an all-time high. These facts would appear to refute claims that the country is in a recessionary period. In the first nine months consumers boosted their outlays for goods and services by $15 billion to a total of $326 billion. Savings in this period were $2,300 million higher than a year ago — a total of $25,900 million.

Building construction for 1961 looks promising with a 4 percent increase over this year indicated. Public response to the 1961 motor cars has been favorable and the industry, after the inventory of 1960 "bargains" have been cleared away, anticipate a good year. Farm income has been on the rising side and will be better for 1960 than forecast earlier this year.

Steel, as well publicized, has remained in the doldrums, yet it is producing at 95 percent of the 1947-49 average. Its low rate is largely a matter of excess capacity — and somewhat the result of imports.

Manufacturers' wire orders have been increasing slowly and the same is true of high carbon specialty wire. Demand for welded wire fabrics for road and other reinforcement is substantial. Wire products sales are quiet and merchant wire products have become seasonally slow. Automotive wire sales are poor due to the large inventories of wire and wire products on hand in the Detroit plants. Upholstery spring wire sales have been good, but are expected to taper off until next year, as this product is subject to seasonal demand.

A bombshell was tossed into the electric wire and cable ring in November when a major producer announced substantial reductions in prices, which was followed quickly by the field. The reductions, however, reflect a steadying of prices that quite generally were being cut by most makers of building, paper insulated, lead sheathed and reinforced plastic cables. A growing volume of imports doubtless had some bearing on the cuts, which reduce many operations to negligible profit margins.

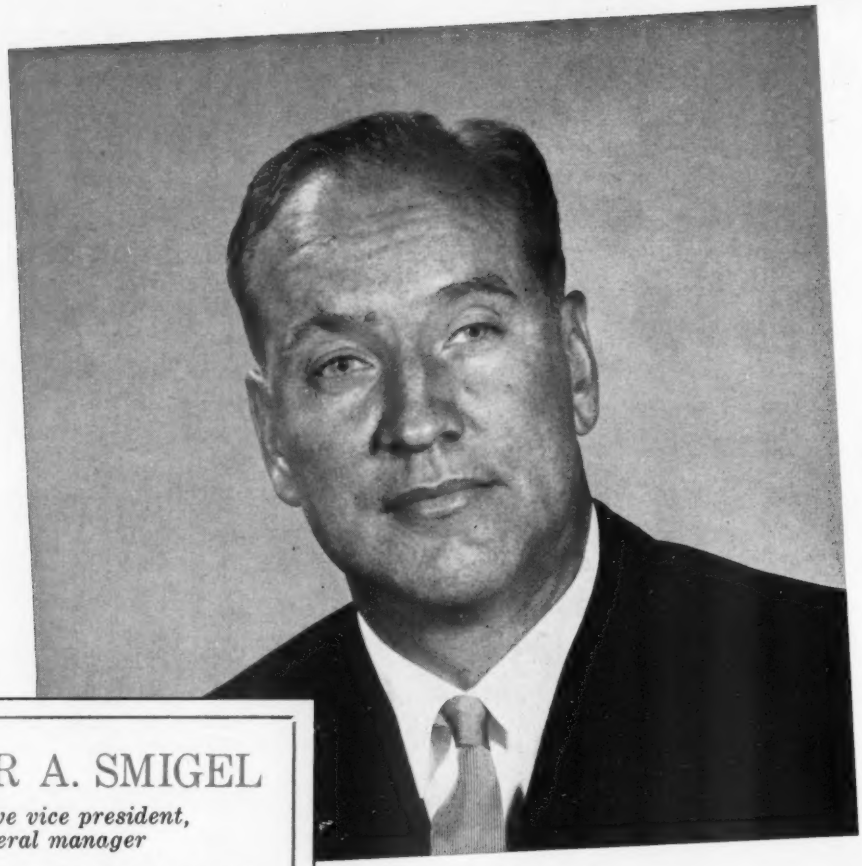
Probably unemployment was a big factor in labor circles in the election results. While very real in some industries, particularly those like steel and wire, coal, etc., much of this has been brought upon the workers by the insistent demands for higher wages and by technological changes in materials and processes.

Competition is as old as the hills. Many wars have been fought on its account and many provisions have been devised throughout the ages to maintain favorable balances of trade. Some controls in many countries have been the result of economic necessity, but no control ever has been contrived that will resolve the problems of competition. These never will be solved until all nations are able to send goods into world markets under essentially the same conditions of production.

If and when foreign and domestic producers of equipment and goods can sell on an even footing, each then will have the opportunity to win customers on the real merits of products. Should this utopian state ever be achieved, then and only then can swords be beaten into plowshares.

Edmund D. Nichols

EDITOR



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Cold Heading and Cold Extrusion of Wire

by John C. McMurray
Research Assistant to the President
Waterbury Farrel Foundry & Machine Company
Division of Textron, Inc.
Waterbury, Connecticut

This paper was presented at the Annual Convention of The Wire Association on November 15, 1960, at Chicago, Illinois.

The author received Bachelor and Master Degrees in Mechanical Engineering from Princeton University, and a Master's Degree in Business Administration from Harvard University. He also is a Registered Professional Engineer. Before entering upon his industrial career he was an Instructor in the Department of Mechanical Engineering at Princeton University.

"The present trend in cold heading of bolts, rivets, etc., has been evident for some time. It is toward more and more difficult and unusual types of product. Those products requiring higher and higher unit pressures in the die will probably furnish the most interesting developments in the immediate future. Extrusion in combination with upsetting and pressing, and possibly with some slight elevation in temperature, will play a major part."

* * *

That statement is as timely now as when **Mr. Roy H. Smith** made it in 1936 when he was Vice President of the Lamson & Sessions Company.[1] Certainly new techniques and processes will be developed for the heading industry. However, the present major emphasis is to more fully develop the older processes to produce special parts requiring higher degrees of deformation than the rivets, bolts and nuts that are the traditional product of the fastener industry.

* * *

Although there are some rules concerning amounts of metal which can be successfully handled in various deformation processes, the bulk of published data relating to the heading art is qualitative with emphasis on material savings and product quality in comparison with cutting methods of manufacture.

* * *

Recognizing the lack of quantitative information, Waterbury Farrel has undertaken an experimental program of dynamic tool load measurements to provide the deformation pressure data needed by the tool designer and applications engineer. Some of our preliminary data is presented in this paper to indicate the capabilities and limitations of the deformation processes.

* * *

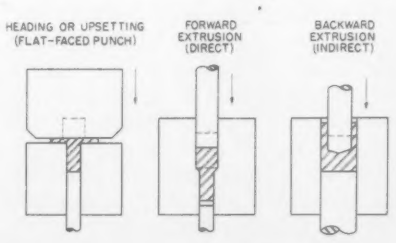

Fig. 1. — Primary Deformation Processes.

This paper will discuss pressure data for the three primary deformation processes: (1) Upsetting, (2) Forward Extrusion and (3) Backward Extrusion (Fig. 1). We will also tell you a little about the techniques we use for measuring tool loads, and illustrate some parts that are currently being produced.

Upsetting

One measure of difficulty in producing a headed part is the length of stock projecting unsupported from the heading die. According to the number of stations available and the type of tooling, the industry generally limits upsets to 2¼ diameters for a single blow, 4½ diameters for two successive blows and 6 to 8 diameters for a triple blow. Buckling tends to occur if larger volume upsets are attempted.

* * *

Another measure, of even greater interest to the machinery builder and user, is the unit pressure (and total load) on the tools during deformation.

* * *

In a work hardening material like steel, we know that resistance to deformation increases with greater degrees of deformation. This is even apparent in a tensile test if the data is plotted in terms

of "true stress" and "true strain." Fig. 2 illustrates the ordinary ten-

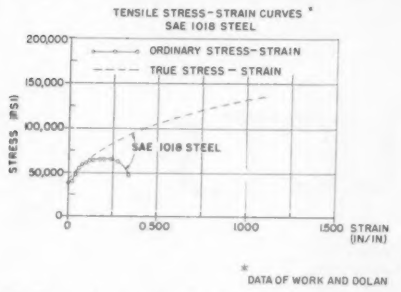

Fig. 2 — * * * * * * * * * *

sile stress-strain curve for a common mild steel, and also the true stress-strain curve which is much more useful for studies of deformation.[2] For the tensile data shown, the true stress is equal to the value of the load divided by the area of the neck and true strain is defined as the natural logarithm of the ratio of initial specimen area to area of the neck at any value of loading.

* * *

Before leaving the subject of tensile deformation, it is interesting to see, in Fig. 3, how some of

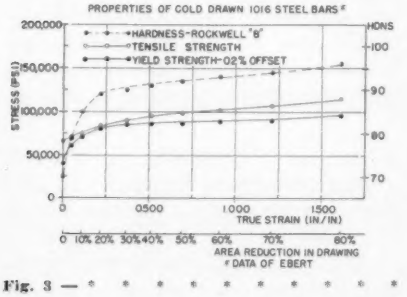

Fig. 3 — * * * * * * * * * *

the physical properties of cold drawn bars vary with degree of drawing deformation.[3] Tensile strength and yield strength are shown as ordinary stress while drawing reductions for the bars are in terms of both true strain and percent area reduction in drawing. Tensile strength has increased by 80%, yield strength by 160%, for an 80% area reduction in drawing.

* * *

We have experimented with upsetting a substantially cylindrical butt end on an extruded blank using a flat faced punch at a rate of 160 per minute. Mild steel was used. The degree of upset was varied by changing the advancement of the punch. Fig. 4 shows

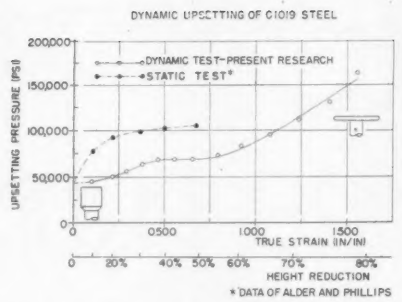

Fig. 4 — * * * * * * * * * *

how upsetting pressure increases with deformation. For comparison, we have some static test data reported by Alder and Phillips for steel of similar analysis.[4] Alder and Phillips used cylindrical specimens with the ends lubricated to prevent barreling and so achieved essentially homogeneous compression up to 50% reduction in height. The static compression data curve is very close in form and magnitude to the tensile test shown in Fig. 2 and the yield strength of drawn bars shown in Fig. 3.

* * *

There are several interesting aspects about the dynamic tests shown in Fig. 4. Up to 40% reduction in height, we find that the upsetting pressure increases but is well below the static test data. This, perhaps, reflects initial yielding near the junction of shank and butt end of the extruded piece and a barreling of the butt end, which may offer lower resistance to compression than the perfect cylindrical specimens of the static test. Unlike the static tension and compression tests, there is a flattening of the upsetting curve at 40% reduction and thereafter the curve rises rather steeply. This indicates that in the upsetting process there are factors present which are minimized or controlled in the tests on homogeneous compression.

* * *

The flattening suggests that perhaps the heat developed by deformation is sufficient to cause a drop in yield strength at a strain of approximately 40%. Thereafter this effect may be masked by the friction of punch and die surfaces restricting lateral flow of material as deformation proceeds.

* * *

If the same pressure data is plotted in terms of the instantaneous ratio of blank diameter to thickness (D/T), a substantially linear plot results which is useful in estimating tool pressures. Fig. 5

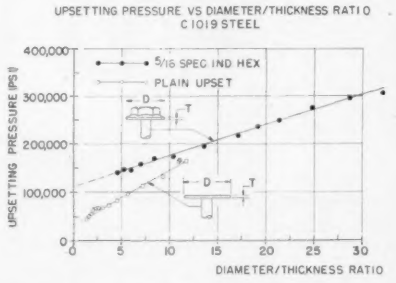

Fig. 5 — * * * * * * * * * *

shows this data as well as data for a conventional headed part, in this case a 5/16" special indented hex washer head. The data for the hex head may be higher than that for the flat upset for two reasons. First, the taper on the upper surface of the washer section may offer greater resistance to lateral flow than the flat punch. Second, the washer section of the head is undergoing the greatest deformation and this element may have a higher surface to volume ratio than the plain upset. This might be considered a size effect.

* * *

Total tool loads can rise quite rapidly as a headed part approaches the fully formed condition. This, of course, occurs because both unit pressure and the cross sectional area of the part are increasing as deformation proceeds.

Extrusion

Unlike the heading process, which compresses the workpiece in the axial direction and thereby expands or upsets material in the lateral direction, extrusion involves compression of confined material in a way to reduce the cross sectional area of the workpiece and thereby also elongate it. Since the material in the zone of deformation is essentially in a state of uniform compression, the area reduction in extrusion can be much greater than is possible in bar or wire drawing where tensile failure limits the amount of reduction per die. Both forward (direct) and backward (indirect) extrusions are common

to the present day heading art. Direct extrusion serves two useful purposes in conventional screw or bolt manufacture. First, it may be used to reduce the thread section of a bolt to pitch diameter. Subsequent thread rolling of this portion of the blank will bring the thread crests up to the diameter of the unextruded portion of the shank.

* * *

A paper by Townend and Wilson discusses a second technique of starting with wire of diameter greater than shank size, extruding a portion of the blank to form a shank in the first die, transferring the workpiece to a second die and simultaneously extruding a portion of the shank to pitch diameter and upsetting the unextruded portion of the blank to form a head.[5] This technique offers several advantages over the conventional progressive heading process which starts with wire of shank diameter. First, extrusion of the shank portion raises yield and tensile strengths. Second, in upsetting a given head, the degree of deformation (and pressure) is lower due to the larger initial diameter of the headed portion. Third, if a very large volume of metal is required in the head, a large extrusion reduction may be taken, leaving a volume of unextruded metal sufficient for the upset in a second die. Parts of this description would be limited only by allowable extrusion pressures, machine cut off capacity and header tonnage capacity.

* * *

The backward extrusion process is primarily used for the production of hollow articles, often quite unrelated to the usual fastener industry products. Some parts may require the use of all three deformation steps; backward extrusion, forward extrusion and upsetting. Two of these steps may occur simultaneously but often they are performed in successive operations.

* * *

Investigators of the extrusion process have found that extrusion pressures are a linear function of true strain. For extrusion operations, true strain (or natural strain) may be calculated as the natural logarithm of the extrusion ratio where the extrusion ratio is the ratio of billet area to extruded area.

* * *

Fig. 6 shows punch pressures for

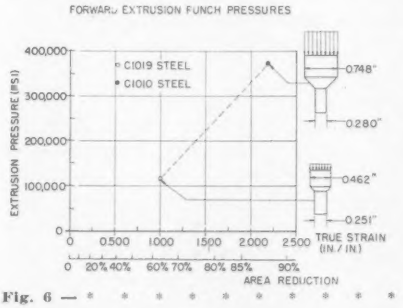

Fig. 6 — * * * * * * * * * * *

forward extrusion taking area reductions of 63% and 88%. Reductions of 60% with average punch velocities of 20 inches per second are being done in production; whereas the 88% reduction was a limited experiment. Both of the steels showed evidence of prior cold working. Hardness of the extrusion slug cross section at half-radius was 89 Rockwell "B" for the C1019 and 84 Rockwell "B" for the C1010. The extruded sections had hardnesses of 99 Rockwell "B" and 103 Rockwell "B" respectively for the C1019 and C1010.

* * *

Backward extrusion punch pressures are shown in Fig. 7. The

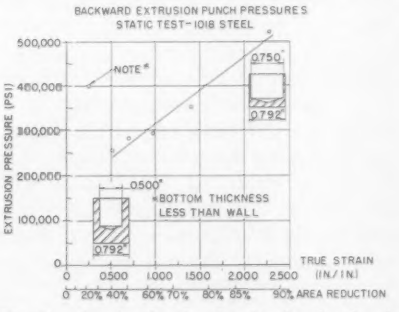

Fig. 7 — * * * * * * * * * * *

trend line has been drawn through data obtained from static tests covering area reductions from 40% to nearly 90%. One data point at 20% reduction is well above the trend line through the other data. This peak pressure was obtained for an extrusion having a bottom thickness less than wall thickness. Area reductions of 70% are being made in production by backward extrusion. Punch breakage would be a problem with higher reductions.

The data on forward extrusion pressures are for the points of peak pressure during extrusion cycles. The peak pressure normally occurs soon after the start of deformation and may then drop 10 to 20% below the peak value at the end of the extrusion stroke. The heat created during initial deformation probably causes a drop in deformation resistance for the material displaced later in the extrusion cycle. Surface friction between extrusion slug and die wall would also be expected to drop as the slug becomes shorter during extrusion.

Tool Load Measurement

Electric resistance strain gages, together with suitable recording equipment, permit the measuring of tooling loads within a production machine under actual operating conditions. The strain gages are applied to a load carrying element in the machine. Calibration of the load member is conveniently done by static loading. The techniques of gage application and of strain measurement under load are well known to experimental stress analysts and will not be discussed here. It is, however, important that the gages be well protected against shorting from lubricants and coolants and that the lead wires be protected from mechanical damage.

* * *

Fig. 8 shows three transducers

Fig. 8. — Tool Load Transducers. * * *

suitable for tool load measurements. One is an extrusion punch and the other two are load cells which are placed behind conventional heading punches and dies. Occasionally it is convenient to use a load carrying section of the machine frame for strain gage attachment but this may create some problems in load calibration.

Process Characteristics

The incentive of lower product cost often causes initial emphasis to be placed on the material sav-

ings and improved physicals that are possible with the deformation processes. Some of the less obvious aspects — equally important for successful production — are directly related to the deformation pressure data already shown.

* * *

Since deformation resistance of steel increases with higher carbon, manganese, and other elements, we choose the lowest carbon and alloy content that will meet the customer's requirements. We prefer to use 1008, 1010, 1012 or 1013 steels, particularly for intricate extrusions. Rimmed steel is cheaper than killed steel and can be successfully extruded. On large upsets, we have used 1008 aluminum-killed steel having special heat treatments. When large deformations are being taken, wire of consistent high quality is needed. The wire producers are offering material of special heading quality and special finish for this work.

* * *

Notwithstanding the dramatic area reductions shown earlier, we strongly urge that part users permit the redesigning of parts in order to eliminate the very thin walls and flanges that require very high tool pressures. It must be clear that the lower tooling pressures reduce the problems of lateral tool stability and machine deflection, permit the use of smaller headers and lower cost tool materials, and result in closer tolerance products.

* * *

Dimensions of headed and extruded parts are commonly held to plus or minus 0.003 in. on lengths and diameters. Concentricity can be held to 0.002 in. total-indicator-reading. Finish depends upon the quality of both wire and tools. A 30 microinch finish is normal. It is wise to inform the tool designer of the critical dimensions and finishes on a part and permit him some latitude on nonfunctional dimensions and surfaces.

Tools

Tool materials are selected on the basis of type of service expected. Factors to be considered are: desired tool life, method of tool construction, and configuration of the tool parts. Working pressures on the tools are, again, very important and the tool steel companies will, no doubt, discourage the use of heading and extrusion tools subject to working pressures in the 300,000 to 500,000 psi range. Straight carbon water hardening tool steels in various grades are used for hobbed dies and die inserts where cross sections are not large or section changes abrupt. Oil hardening tool steels are used for larger tools and applications requiring minimum distortion of tools in hardening. High speed tool steel inserts, suitably cased, are used for smaller dies subject to high loads and having sharp corners or severe section changes. The use of carbide dies can often be justified for intricate dies and for tools intended for long-run production. The particular grade of carbide is usually left to the die manufacturer.

* * *

High carbon, high chromium steel is used for cutoff die inserts — an application requiring a wear resistant cutting edge.

* * *

Extrusion punches and other cylindrical tool elements, subject to high axial loads, are made from high speed steels of various types. It is also important for punches of this sort to be sufficiently strong to resist a certain amount of lateral deflection under axial loading. Punches of the heading type which are subject to both high axial loads and bursting forces have been successfully made of the newer air hardening, shock resisting tool steels. Best results are obtained with these steels having a surface hardness of 57-58 Rockwell "C", rather than the 60-62 Rockwell "C" normally specified for the older tool steels. Tool life is very difficult to estimate. Extrusion punches may produce from 40,000 to 70,000 pieces. A steel die may produce 100,000 to 125,000 pieces, while a carbide die may have a life of 10 to 20 million pieces. Tool finish is exceptionally important. Punches and dies that are not highly finished will inhibit metal flow and raise tool pressures.

* * *

Lubricants also play an important part in keeping tool pressures low and preventing galling of the tools. Header wire normally has a surface coating of lime or aluminum stearate that has remained from the cold drawing operation.

* * *

Mineral oils or emulsifiable lubricants may be used for normal work. Lubricant manufacturers offer a variety of oils and pastes containing sulphur and other extreme pressure additives for severe working. Application of the lubricant may be made by wiping on the wire surface before cutoff or by flowing on the punch or workpiece before it enters the die.

* * *

Phosphate coatings are generally used to permit extreme deformation in a single extrusion, and there is some interest in using phosphate coated wire in conventional headers. This coating should reduce friction between the slug and die wall in extrusion, but would be of limited value in upseting since the slug ends are not coated. Our practice is to use non-phosphate coated wire and work the slug progressively in a series of dies to keep individual tool loads as low as possible.

Types of Parts Being Produced

Fig. 9 shows two examples of single blow upsets; an extrusion slug, and a button head rivet. Both parts are produced from ¾" medium carbon steel wire. The extrusion slug is subsequently annealed, phosphate coated and extruded in a conventional press.

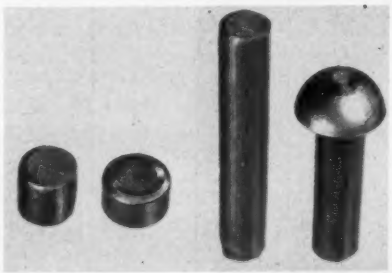

Fig. 9. — Extrusion Slug and ¾ in. Button Head Rivet.

* * *

Fig. 10 shows a ⅝" flat head socket screw produced from 4042 steel. The cutoff slug is upset in two blows using a single die double stroke header.

(*Please turn to page* 1718)

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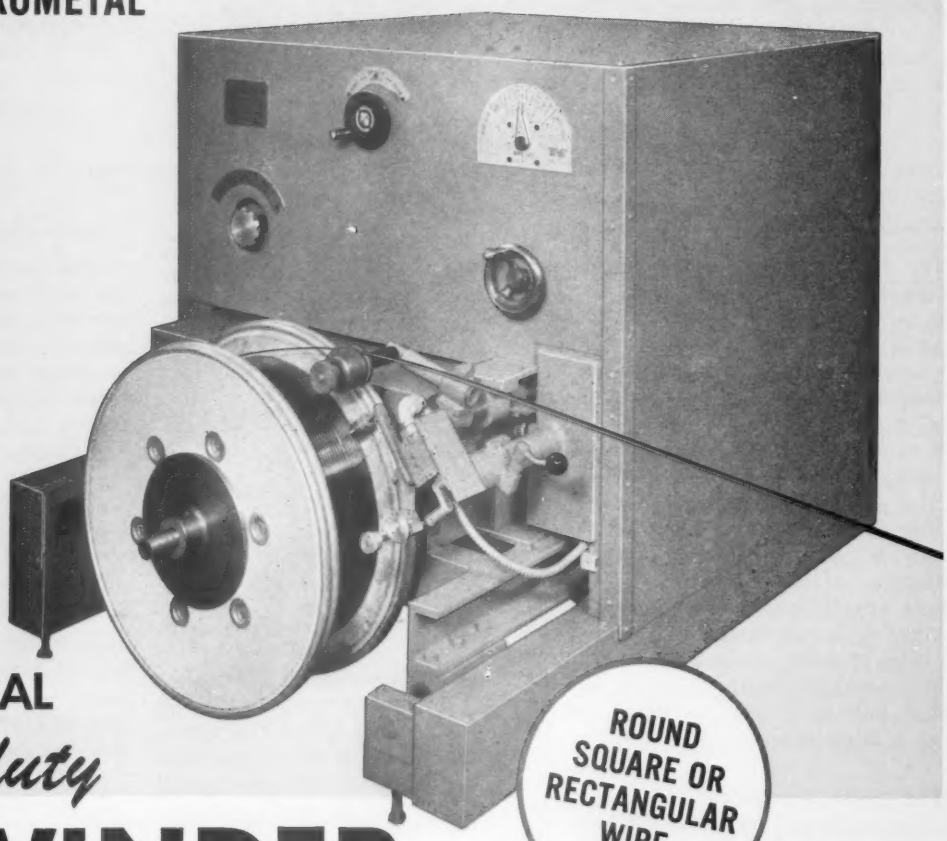

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Vertical and Horizontal Continuous Vulcanizing

by Philip C. Greene
Division Manager
Davis-Standard Division
Franklin Research & Development Corporation
Mystic, Connecticut

This paper was presented at the Annual Convention of The Wire Association on November 15, 1960, at Chicago, Illinois.

Ten to fifteen years ago, many people in the wire and cable industry were predicting the rapid growth of plastic compounds for use as electrical insulation, and the consequent decline in the use of rubber. They were completely correct in forecasting the plastic growth, but the interesting fact is the substantial rate at which rubber insulation has, and still continues to expand. Some of the properties of neoprene, butyl and others are difficult and sometimes impossible to duplicate, and right at this present time interest in new processing equipment to increase rubber insulating capacity is at a high level.

* * *

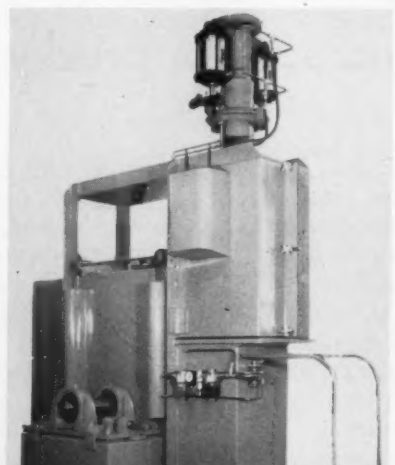
The most productive and economical process for curing rubber insulation is, of course, that of continuous vulcanizing. The older methods of pan or drum curing are still in use today, but normally find favor only where very short runs are involved, or where extremely large sizes must be handled. Also some cable specifications still call for curing in lead.

* * *

The Horizontal C. V. was the first continuous system for vulcanizing rubber cable, and for many years the curing tube was installed on the true horizontal for its entire length. This limited its use to rather small, light wire constructions. As early as 1951 Davis-Standard introduced a slight one degree decline to the first 38′ of the vulcanizing tube, creating in effect the first modified type Horizontal machine. This configuration resulted in an 8″ drop in the 38′ distance and allowed the insulating of wire up into the circular mil sizes. The maximum size conductor normally attempted on such a modified Horizontal was about 500 MCM due to the problems of scuffing or flattening of the uncured rubber dragging along the bottom of the tube when larger sizes were attempted.

* * *

Over the years since 1951 we have supplied several further modified horizontal lines where the decline of the tube started out at a 3° angle and gradually changed back to the horizontal. On several occasions we have also supplied lines with essentially the same angular difference from beginning to end, but have tilted the whole line some 3°. With these modifications it has been possible to handle up to 1,000 MCM size, and even larger on occasion, particularly with lighter construction jacketing work.



Davis-Standard 60″ sheave with integral water seal for lower end of vulcanizing tube on Vertical CV line.

Still there was a definite need for equipment designed to handle much larger cable sizes, do big jacketing work, and particularly to run heavy wall butyl insulations on large conductors for high voltage power cable use. Thus we designed and built our first Vertical CV machine in 1956. We now have in actual operation ten additional Vertical CV's, as well as several more now being either installed or manufactured.

* * *

A continuous vulcanizing line, whether Vertical or Horizontal, has many components comparable to any other insulating line, including the conventional items of the pay-off, capstans, extruder, and take-up. The important difference, of course, is the vulcanizing tube through which the cable must pass immediately after leaving the extruder crosshead. Here we are working with a pipe and seals which must contain 250 pounds of steam pressure, through which a cable must pass at a uniform speed without touching either the bottom or top of the tube until sufficiently cured.

* * *

Herein lie most of the problems connected with any CV line. All the equipment and operations prior to the crosshead and after the water seal are "out in the open" and can be readily observed, closely watched if necessary, serviced, adjusted, etc. The main concern is this critical section in the tube, where it is difficult to spot trouble until the cable emerges from the seal, and then it's too late!

* * *

Basically, our conviction as a machinery designer and builder is that equipment must be engineered for practical, continuous operation.

It should be productive, rugged, as automated and versatile as possible, but above all it must be mechanically sound. By this we mean a line that is easy to operate and that will put out a quality product in spite of many variables that are certain to occur.

* * *

There have been all kinds of minor variations to fit existing plant facilities, as well as a series of improvements as new lines have been engineered, but they all have been predicated on the fact that conditions inside the vulcanizing tube are trying at best, and that a basic, fundamentally sound approach in design will make the line most productive over the long run, in the diversified wire plant of today.

* * *

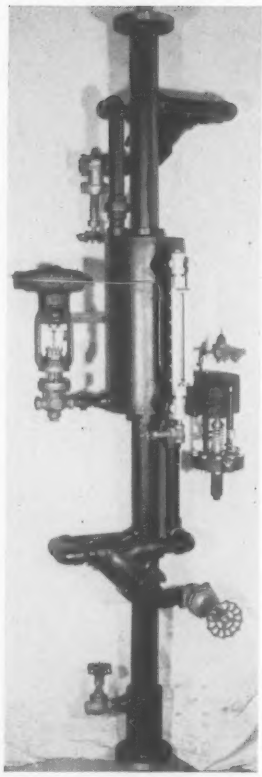
With this basis for our design of the Continuous Vulcanizing line, let us consider the two systems of Vertical and modified Horizontal tube configuration, as to their points of similarity, as well as their differences, and what each is intended to do. First we will describe just what we mean by each designation and their points of similarity.

* * *

By a Vertical CV we mean a line where all the curing is done on the Vertical plane. The core to be insulated, or the cable for its jacket, pass over a capstan high up in a tower or penthouse, and travels vertically through the crosshead of the extruder down the entire vulcanizing tube without changing direction.

* * *

By both theory and practice most people agree that this is the straightforward, foolproof system for curing large diameter cables. In effect you are curing "without any tube" as far as the hazards of dragging, scuffing or flattening are concerned. The cable tension can vary to extremes without change in wire speed and there is still nothing to abrade the covering. You can run anything from small wire to 3″ diameter without any of the traditional problems. The steam-water interface is simplicity itself to maintain, with our patented system which measures the hydrostatic head of water, and automatically corrects to keep a



Davis-Standard patented water level control for vertical CV installations. * * *

fixed level. Expansion and contraction problems are easy to design for, and there are no problems of steam hammer. The string up and start up of the line are the easiest of any type of CV. For ease and economy small diameter lead wires can be used, and these leads can be lowered down the tube without using steam.

* * *

Before going into detail on the Vertical, let's describe in general what we mean by a modified Horizontal CV line. This has all the same basic auxiliary components including extruder, pay-off, and takeup, as well as the capstans at each end to control speed and tension. In this case the tube is approximately Horizontal and relatively straight except for the few degrees of additional slope at the entrance end. Of the many modified Horizontals supplied, the maximum amount of angularity between the splice box and the final seal has been 3°. The conventional lines have started with the crosshead and splice box at a three, two or one degree slope, and changed within the first several sections back to the Horizontal. Others have had the same total degree change, but we have tilted the whole line 3°, so that the first few sections run 6, 5 and 4° with the balance at 3°. This latter arrangement allows using the water level control as the steam-water separator instead of a mechanical steam seal.

* * *

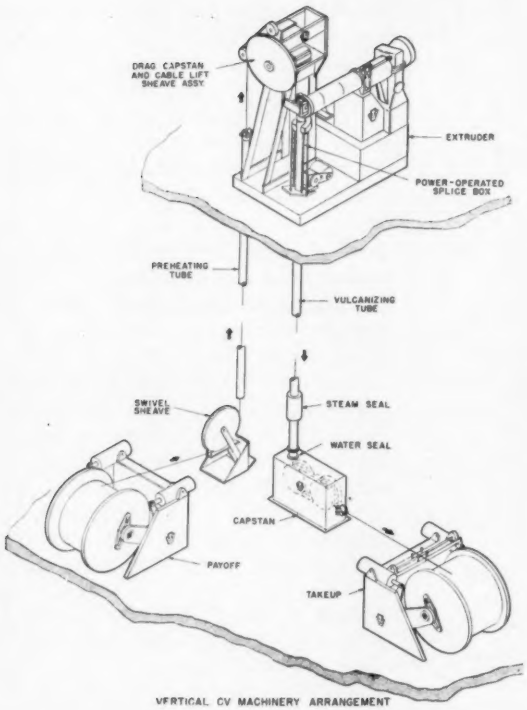
As a major point of similarity between the two systems, we would like to stress that the Vertical is straight through its entire vulcanizing length, and certainly is not critical as to tension variations. Likewise, the modified horizontal has only a few degrees of angle change, and considerable tension variation is allowable. While the latter requires a certain minimum tension to keep the wire off the bottom until it has sufficient cure, it does not require an exact or critical tension. If 400# or 500# is the minimum necessary for a certain cable, that tension can be varied upward by several hundred pounds without any danger of scuffing on the top, due to working in the area of a relatively straight line pull where a large increase in tension makes very little change in the catenary.

* * *

A reasonably high tension is generally desirable, and sometimes essential, for a number of reasons. In the first place, some tension is required if a wire straightener is used to minimize "birdcaging" of the stranded copper conductor just prior to the crosshead. Secondly, a certain amount of pull is consumed in getting the insulated wire through the seals. This seal resistance is not constant, so that the higher the total tension, the less significant will be the particular variation caused by the seal.

* * *

Another requirement for tension is in the head itself, when running at the speeds of which a CV line is capable. While there is very little head resistance at slower speeds, — in fact the rubber will often push the cable through the head at minimum speeds, — still the situation reverses at higher speeds, and pull is required. Quite possibly the total of all the resistances which exist between the two capstans, such as those mentioned above, plus the drag on the bottom



VERTICAL CV MACHINERY ARRANGEMENT

of the final sections of tube, could easily amount to a substantial value before beginning to apply tension to the cable itself.

* * *

An additional important factor which is often overlooked is the "piston effect" when starting up with a small lead wire pulling a large main cable. It is most desirable and economical to use this procedure for starting and finishing a large, expensive cable, but of nesessity it means large variations in tension. Incidentally, we have used this same principle of the piston effect for years in our splice box design, where the steam pressure keeps the splice tube closed without any mechanical lock.

* * *

When we total up the effect of all these variable factors and realize that each will have a different value at start up compared with running conditions, and that they will all change for different cable sizes, then the importance of a basic mechanical design which can be operated easily over the range of varying conditions becomes obvious.

* * *

Another important consideration in making quality cables, even when scuffing can be eliminated, is that any change in catenary is a change in cable length, which means a change in wire speed through the head. And of course, any change in speed is also a change in insulation diameter. On any Horizontal CV there are minor changes in catenary which must be occurring with changes in tension, but by keeping the angle of tube slope to a minimum for a relatively straight pull with high tensions, then the amount of catenary change with its resultant speed change, is within practical operating limits. This is certainly attested to by the large number of such lines running daily in the industry.

* * *

All these problems are simply and surely overcome with the Vertical CV design, without the need for critical sensing devices or constant operator adjustment. There is no catenary to contend with so the tension can be at any value, either momentarily or over long cycles, without having any effect on the uniformity of the extrusion operation. You merely set enough pull on the capstan to get it running, and then leave the setting alone.

* * *

Most of the installations to date have all of the vulcanizing and the pressure cooling completed on the Vertical plane without a bend. The ratio of vulcanizing to pressure cooling has ranged from 3:1 up to 5:1 in length. It is distinctly possible that only a small portion of the pressure cooling need be done on the vertical, and instead the patented water level control could be installed near the end of this run, and the pressure cooling accomplished both in a short vertical distance, around a special 90° bend and the balance in a generally horizontal direction. This approach would mean a slight departure from the "all vertical" line, but would still appear to be operationally sound. In the critical curing length there would still be no exact tension requirements, and no tube wall to touch. The first contact would be in the pressure cooling section, and the water level control unit could easily be located at the minimum necessary height above the bend.

* * *

Some of the principal questions in the minds of most cable companies considering a new installation are what range of product will it handle without excessive scrap, what kind of production will it give, and how much will such an installation cost. Generally speaking, most companies in the rubber insulating field, have more than one CV. A good modified Horizontal line can easily handle up through 500 MCM without any problems. If they have two Horizontals, then normally they will run small sizes such as drop wire, or #8 through #14 building wire, and flexible cords on the smaller unit. This should have only a degree or two of angular difference in the tubes. A second Horizontal of approximately the 7° to 3° type would be ideally suited for anything from #8 through 500 MCM, and could take up to 1,000 MCM copper, or even larger in flexible cable constructions.

* * *

To complete the range, a Vertical CV is intended for the big work, such as the 1,000 MCM to 2,000 MCM, heavy wall butyl power cable, or large jacket work. There is

(*Please turn to page* 1715)

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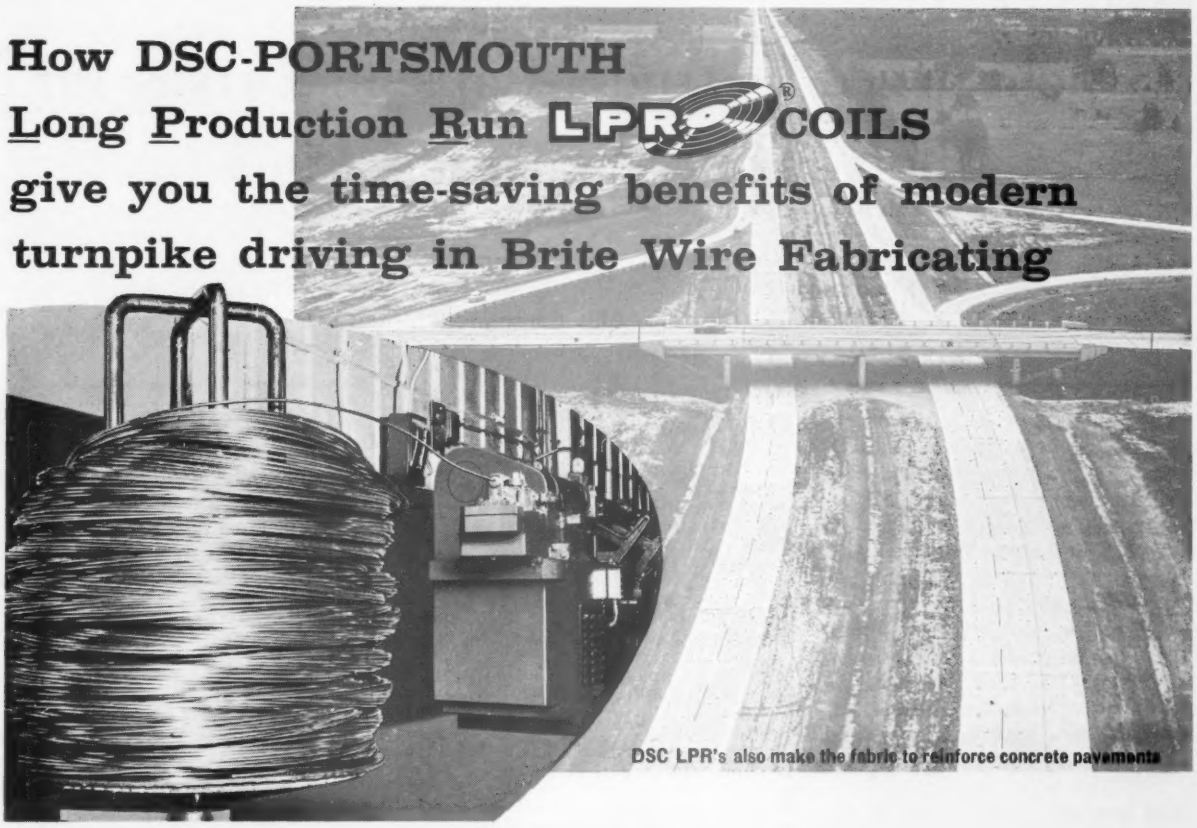

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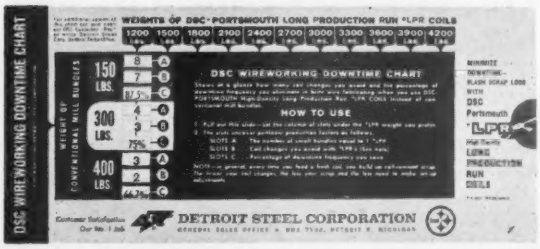
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Synchronized Extruder-Capstan Drives for High Speed Insulating Lines

by

Arthur W. Harrington, Jr.
Chief Application Engineer

and

Herbert L. Kelley, Manager
Adjustable Speed Drive Sales

The Louis Allis Company
Milwaukee, Wisconsin

This paper was presented at the Annual Convention of The Wire Association on November 15, 1960, at Chicago, Illinois.

Mr. Harrington was graduated with the degree of Electrical Engineer from Cornell University in 1940. Other than a 5 year period as a commissioned officer in the U. S. Army Signal Corps during World War II, he worked with the Philadelphia Electric Company for two years as a Systems Planning Engineer, and four years as Vice President and General Manager of a contracting firm.

In 1950 he joined the Louis Allis Company of Milwaukee, Wisconsin, where he has held positions as Manager, Special Control Sales; Engineering Manager, Eastern Region; and his present position as Chief Application Engineer.

Mr. Kelly was graduated with the degree of Electrical Engineer from Purdue University in 1949 after serving 3 years with the U. S. Army Signal Corps during World War II. He has been employed since 1949 as a Sales and Application Engineer by the Louis Allis Company of Milwaukee, Wisconsin. He has held the position of Manager, Ajusto-Spede Sales and his present position as Manager, Adjustable Speed Drive Sales.

With the reduced price of insulated wire in a highly competitive market, it is necessary to produce this wire fast and with a maximum possible conservation of insulating material. The precision with which the insulating material is applied to the wire is very definitely related to drive performance. The scope of this paper is to describe a two unit electric drive utilizing synchronous control for precise speed matching and ratioing of an Extruder and Capstan.

* * *

The manufacturing cost of the product depends largely upon two things:

A) Cost of material
   1) Copper or aluminum
   2) Insulating compound
B) Direct labor

A precise, dependable and easy to operate Extruder-Capstan line cannot reduce the cost of copper or aluminum, but it can reduce the scrap cost.

* * *

The amount of direct labor per pound of insulated wire depends upon the speed at which the insulating line operates. High operating speeds can be attained only when the line can be pushed to a high speed and still produce a saleable product.

* * *

A saleable product can be produced at high speed if 1) excess insulating compound is extruded to make certain passing the minimum "thickness test" or 2) precise speed relationship is maintained between Extruder and Capstan.

* * *

Adding excess compound increases the raw material cost. A typical specification for #14 gauge solid AWM building wire might call for an insulation diameter of .128 ± .002". A reduction of this tolerance to ± .001" can represent a reduction of two percent in the amount of insulation compound used. This reduction in the amount of compound used can easily result in cost savings in the order of $8,000 per year on a typical wire insulating line.

* * *

Although there are other factors that affect the diameter of insulation on coated wire, the most important is unquestionably the speed relationship of Capstan to Extruder. If the Capstan "drifts" with respect to the Extruder, the insulation diameter will change over a period of time accordingly. This is not too serious, if automatic diameter control is applied, for the automatic diameter control can compensate for this long time, slow speed change. If however, the Capstan speed changes abruptly, or erratically, over a short time period with respect to the Extruder, the operator (with hand calipers) or the automatic diameter control, cannot properly compensate for these changes. As a result, inferior grade insulated wire will be produced. With a known condition of short time speed variations, the wire manufacturer has no choice but to put excessive compound on the wire to insure that he does not violate the specification for minimum diameter or thickness of insulation.

* * *

A synchro controlled Extruder-Capstan drive eliminates the possibility of long term drift and short term speed variations regardless of temperature, line voltage, or load as the two drives are tied-in and controlled by a perfect RPM relationship. This is preferable to the speed regulated type of drive that employs a voltage or current feed back to represent the actual speed of the drive. Obviously, such voltage (or current) does not as faithfully represent speed as an actual rotational signal, as does the voltage signal produced by a synchro.

* * *

Two different synchro control systems have been applied to wire lines. See Figure 1. The most common is to utilize a conventional adjustable speed drive for the Extruder, taking the master synchro signal from a synchro generator on the Extruder and having the Capstan follow this signal at a predetermined ratio to hold a fixed speed relationship between the two drives. The second system refers both Extruder and Capstan back to a synchro reference, which is obtained by ratioing an RPM speed from a synchronous motor operating from the 60 cycle supply lines, much the same as an electric clock. Both Extruder and Capstan

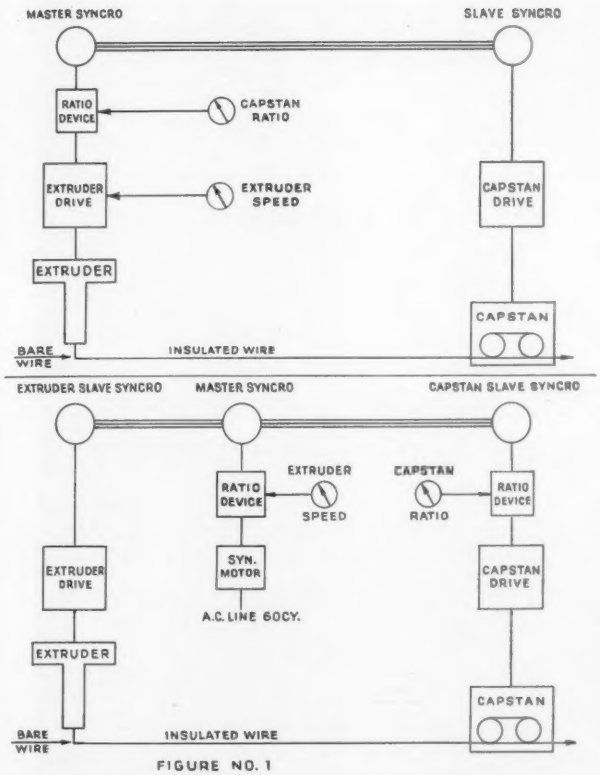

FIGURE NO. 1

Fig. 1 — Two basic schemes for synchro controlled extruder—Capstan insulating lines. * * * * * * * * * * * * *

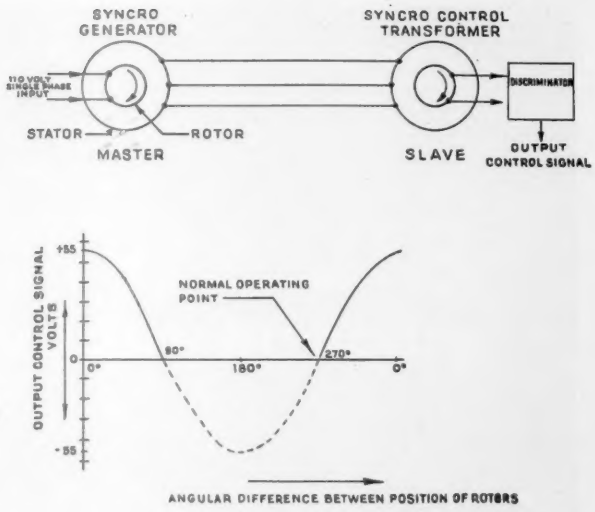

FIGURE NO. 2

Fig. 2 — Synchro system and output control signal. * * * *

will then reference back to the 60 cycle supply source, which is very closely regulated by the power company, resulting in a precise, absolute speed for both Extruder and Capstan.

* * *

The synchro devices utilized for this control are industrial precision instruments, and were originally developed for Naval gun control. These synchros are electrically very similar to wound rotor motors, having a single phase input to the rotor with a 3 phase stator as indicated in Figure 2. The synchro generator is used as the reference RPM signal and is similar to the synchro control transformers, which are used as slaves, except that the synchro generator is of low impedance, designed to operate with a number of slave control transformers. Referring to Figure 2, it is seen that the 3 phase connections on all synchros are made common. A 110 volt single phase input is applied to the synchro generator, and an output signal is received from the control transformer and its associated discriminator depending upon its angular position with respect to the synchro generator. If the control transformer rotor is 90 degrees electrically displaced from the position of the synchro generator, the output control signal will be zero. If the synchro control transformer rotor is at zero, or 180 electrical degrees with respect to the position of the synchro generator, a full voltage of approximately 55 volts will be produced as the output control signal. Since only a small voltage is required to operate an amplifier-regulator controlling the drive, it is practical to regulate within an angular variation, one synchro with respect to the other, of approximately 1 to 3 degrees. Therefore, with the synchro generator (Extruder) turning at a predetermined RPM speed, the control so regulates the speed of the drive associated with the control transformer (Capstan)

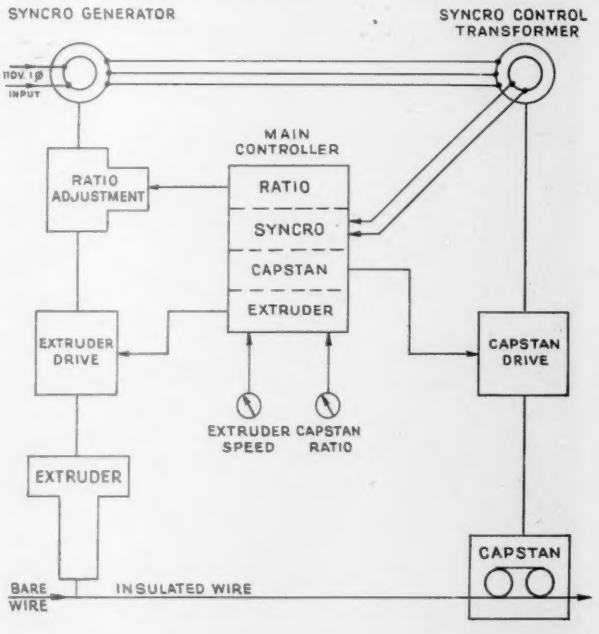

FIGURE NO. 3

Fig. 3 — Capstan follower type synchro system. * * * * *

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synchro as to maintain exact RPM for RPM matching, and position matching within 1 to 3 degrees of synchro rotation. The error signal of this system is an angular position error much the same as if the two drives were connected by a mechanical lineshaft, and a certain amount of twist in the lineshaft were present. Obviously, this angular difference does not affect wire diameter as an RPM error does.

* * *

Figure 3 shows the general scheme utilized in a Capstan follower synchro system. The Extruder drive is a conventional adjustable speed drive that permits low speed bleed operation and smooth acceleration from low speed to operating speed of the Extruder. The amount of "drift" of the Extruder drive is of no particular significance since the Capstan will be made to follow the Extruder speed faithfully. Drift of the Extruder will merely result in drift of the entire wire line. The synchro generator is connected to the Extruder drive through an infinitely variable, adjustable speed device. This device employs metal to metal contact for extreme accuracy, and since virtually no load is imposed upon it by the synchro generator, slippage is eliminated. This mechanism sets the ratio of Extruder drive to Capstan drive, and since it is infinitely variable in both speed decrease and speed increase directions, all combinations of Extruder to Capstan speed ratios are available. The operator can preset this ratio and get a visual indication of the ratio from an electric meter operating from a potentiometer within the ratio mechanism. Figure 4 shows a typical eddy current Extruder drive with synchro generator and motor operated ratio device mounted in place. Timing belts are used.

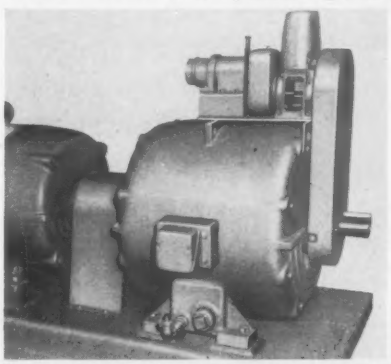

Fig. 4 — Extruder drive with synchro generator and motor operated ratio device mounted in place.

* * *

The synchro control transformer is mounted on the Capstan drive in fixed ratio to Capstan speed. Electrically, the signal from the synchro control transformer is fed through a discriminator, which converts the signal to DC, positive or negative, to indicate whether the control transformer is ahead or behind the synchro generator (Figure 2). If it is ahead, a negative signal is received, which reduces the excitation to the Capstan drive indicating that it should drop back, and if it is behind, a positive signal is received indicating that the Capstan drive should receive more excitation to pull up into proper angular position. As previously mentioned, regulation is within a very narrow band of approximately 1 to 3 degrees rotation.

* * *

In starting the wire line in automatic synchro control, the Extruder is normally first operated at a low bleed speed with the anticipated Extruder-Capstan speed ratio preset by the operator. Refer to Figure 5 for typical operator's control. The operator will press the "Synchronize" pushbutton when ready to start the wire. The Capstan will gently accelerate to a low speed as determined by the Extruder bleed speed and preset ratio and will then synchronize. Once so synchronized, the Ex-

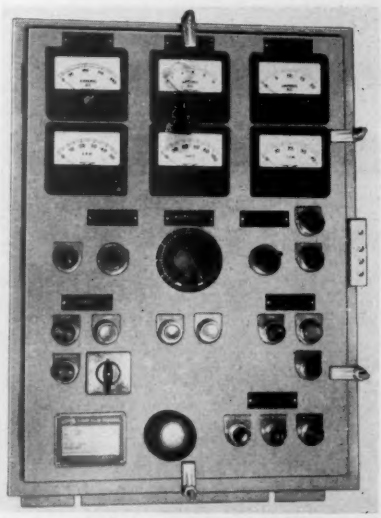

Fig. 5 — Typical operator's control for a synchronized wire insulating line.

truder speed will automatically increase to operating speed under controlled acceleration. The two drives will accelerate together in perfect speed ratio synchronism. While running, the operator can change the speed of the Capstan with the Increase-Decrease pushbuttons to set insulation diameter if his preset ratio proved to be improper. The two drives will continue to operate at precisely this ratio as long as the line is run. An automatic diameter control signal can be used to automatically change the ratio if wire diameter changes by reason of other factors than the speed relationship of the Capstan and Extruder. These changes (normally a result of drift in Extruder temperature or pressure) are usually slow and of small magnitude thus giving the automatic diameter control ample time in which to make minute corrections.

* * *

The second synchro system that has been used is to control both Extruder and Capstan drives from a 60 cycle reference (Figure 1). The same principles apply as described for the Capstan follower system except that both Extruder and Capstan become slaves to the 60 cycle reference source. This reference consists of a small synchronous induction motor driving a synchro generator through a mechanical ratioing device of the type shown on Figure 6. The synchro generator speed determines the speed of the line. A synchro control transformer is geared in at a fixed ratio to the Extruder drive so that the Extruder will directly follow the speed of the reference synchro generator. The Capstan synchro control transformer is mechanically connected to the Capstan through a ratio mechanism so that its speed can be ratioed to the master synchro generator. The same fixed ratio between Extruder and Capstan is obtained as earlier discussed, and operation of the line is essentially the same except that line speed is controlled by varying the ratio mechanism on the master synchro reference. The advantage gained by this more complex system is that Extruder drift is eliminated.

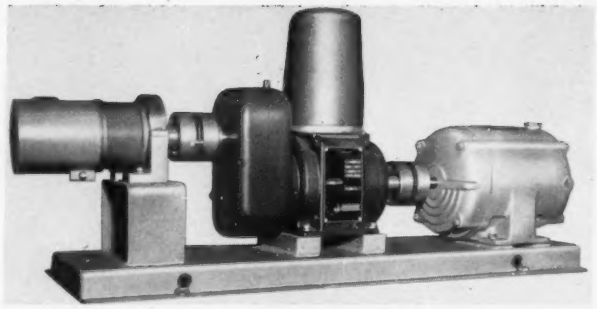

Fig. 6 — Sixty cycle master speed reference incorporating synchronous motor, ratio device, and synchro generator. * * * * * *

In summary, the advantages of the synchro control scheme over other two motor electric drive systems are as follows:

1 — An exact ratio can be set and maintained between the Extruder speed and Capstan speed regardless of the magnitude of set speeds.

2 — The electric error signal produced is an angular error rather than a FPM error and is of no significance to insulation diameter.

3 — It is possible to tie the entire insulating line to a 60 cycle frequency reference for positive control of the speed.

* * *

This type of drive control for an insulating line contributes to the reduction of manufacturing costs by:

1) Permitting high operating speeds

2) Reducing scrap

3) Holding the amount of insulating compound required to a minimum.

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Modern Developments in the Control of High-Speed, Low-Tension Reeling Equipment

by James L. Entwistle, President
Enjaco Corporation
Cranston, Rhode Island

This paper was presented at the Annual Convention of The Wire Association on November 15, 1960, at Chicago, Illinois.

One of the modern developments in the Wire Industry is the trend toward the use of smaller and smaller plastic insulated wire.

* * *

The telephone industry is now using vast quantities of #26 wire and is definitely contemplating the use of smaller sizes in the future.

* * *

We have already built a Preheater for a company which is presently insulating wire with plastic down to #36 and, in fact, specified that the machine should preheat wire down to #50. This is indicative of the new requirements brought about by miniaturization.

* * *

All wire insulated by plastic extrusion is subject to some insulation faults in the insulating process, although it is true that the incidence of faults is becoming less and less as insulating techniques improve. However, we are still a long way from no faults at all. Present day results with plastic insulations, where reel after reel of wire is insulated without faults, are a far cry from the early days of rubber insulation when I first introduced Spark Testing. Then it was quite common to find 20 to 30 faults in de-panning a 3030-foot reel of building wire. In fact, it took a long time for automatic re-reeling to become feasible because the reeler would no sooner get under way than it would have to stop again for a fault.

* * *

In general, all reels of wire from an extruder which contain faults must be re-reeled in order to locate, examine and repair the faults.

* * *

This operation has been viewed with considerable distaste in the past especially when it concerned small wire, due to the very real danger of damage either to the insulation or more especially to the conductor by stretching, caused by lack of strict tension control throughout the entire re-reeling operation from start to stop.

* * *

Because of the smaller sizes of wire, very long lengths are encountered on relatively small reels, some 25,000 feet of telephone wire, for instance, being the standard length on reels approximately 16" O.D. x 5" Wide.

* * *

These long lengths of wire with very few faults have created the need for high speed re-reelers for reasons of economics. With these units, operation must be made to be as automatic as possible for the same reasons and yet, tension must not only be controlled but must be kept at very low levels throughout the entire operating cycle, due to the low yield point of these smaller wires. The problem is further complicated by the fact that in many cases, poorly traversed reels have to be handled on the pay-off end of the re-reeler.

* * *

In addition to re-reeling for insulation faults, there is also considerable need for re-reeling small bare wire from one reel to another.

* * *

The method of spin pay-off at high speed into extruders requires nicely wound reels for proper operation and also requires the accessibility of the conductor leading to the inner winding on the reel for the purpose of butt-welding or brazing to another reel in order to effect changeover without stopping.

* * *

If this inner lead gets broken off in handling, then the entire reel must be re-reeled in order to make a new, accessible inner lead.

* * *

Poorly traversed reels from a wire-drawing machine also often have to be rewound on a re-reeler having an excellent traversing mechanism in order to prevent trouble when feeding into an extruder. Here again we have a requirement for very high speed re-reeling under strict tension control.

* * *

An actual example of what may be required in this instance is one installation from our files in which a 450# reel of wire as small as #28 bare soft copper had to be re-reeled. This was done using a speed of 5000 ft/min. with no appreciable stretch with a winding tension of less than 1½ pounds. Since there was somewhat over three-quarters of a million feet of wire on the pay-off reel, even this speed was none too fast.

* * *

We have found another requirement for high-speed, tension-controlled re-reeling in the splicing of short lengths of wire into a full reel length. Such a requirement is created, for instance, when two wires are twisted together into a pair, or when a multi-conductor cable is laid up. All reels cannot be expected to run out at exactly the same time, and there are, therefore, reels left over with varying lengths of wire on them, which must either be scrapped or spliced together into a continuous length.

* * *

All of the above and other similar operations require the use of re-reeling equipment on which the

pay-off reels as well as the take-up reels have to be power driven.

* * *

When reeling heavy wire, tension is generally not a problem because of the fact that although tension may vary several hundred per cent in the reeling operation, the minimum tension required for reeling is generally low enough so that even if the tension does vary by four or five hundred per cent during the reeling operation, the maximum is still well below the yield point of wire. This condition is not true when reeling small conductors, for the tension required to make a reasonably good package will, in many cases, if increased by only fifty per cent, let alone four or five hundred per cent, result in stretched wire. It is desirable, therefore, that tension control be accurate enough to keep the wire tension in the area of plus or minus ten per cent of the selected norm throughout the reeling operation. For this reason, it is essential that the pay-off reel be power driven.

* * *

There are several types of electrical drive systems which might be adapted for operation on re-reeling equipments such as we have described above. After careful consideration of the systems available, we chose the eddy-current clutch, alternating-current motor combination as the most desirable from the standpoint of simplicity, flexibility and maintenance, as well as from the total Kva. of power drive equipment required. This latter is of no mean importance as indicated by the fact that on one A.C.-D.C. drive system recommended by the maker for use on the high-speed, low-tension re-reeling equipment, the control of which we will describe in detail below, a total of more than 31 HP of Electrical Drive Equipment was required, in contrast to the total of 2 HP of Drive Equipment required by the eddy-current clutch system.

* * *

The re-reeling equipment referred to above is an automatic Re-reeling, Measuring and Spark Testing unit containing all of these functions in the framework of a single machine and embodying all of our new developments in the control of such equipment. This machine was designed to operate under the following specifications:

***Wire Speed*: Constant throughout running cycle, adjustable by the operator from 500 to 2000 ft/min.**

***Jog Speed*: Adjustable by the operator from 100 to 500 ft/min.**

***Reverse Jog Speed*: Same as forward Jog Speed.**

***Initial Acceleration*: Adjustable, to provide instant starting under the worst loading conditions.**

***Normal Time of Acceleration*: 5 seconds to 2000 ft/min.**

***Time required to reach lower preset running speeds*: Proportional to those speeds.**

***Rate of Acceleration*: Adjustable by the operator, to give a total acceleration time of from 4 to 12 seconds with 5 seconds as the norm.**

***Time of deceleration from 2000 ft/min. to standstill under controlled stop*: Adjustable, with 5 seconds as the norm. Tension must be controlled.**

***Emergency Stop*: Must be accomplished in approximately 1 second.**

***Maximum Spark Test Voltage*: 7500 volts A.C. and 10,000 volts D.C.**

* * *

On our high-speed Re-reeling machines the take-up motor is always the master and the pay-off reel is the slave.

* * *

Since the take-up motor is the lead motor, we will first consider the control of the take-up end of the equipment.

* * *

The basic element of the acceleration control of the take-up motor is a 24-notch stepping relay which is automatically advanced by an electronic timing system. This permits considerable variation in the total accelerating time so that the rate of acceleration can be easily adjusted by the operator to the quality of the wind on the reels of wire fed to the machine for re-reeling.

* * *

The shape of the acceleration curve can be predetermined by proper selection of the small 1-watt resistors connected between the points of the stepper. This permits the use of a straight line acceleration curve, which results in minimum acceleration time for a given maximum rate of acceleration. This result contrasts very markedly with the logarithmic type of acceleration curve obtained by capacitor-controlled acceleration.

* * *

By interruption of the progress of the stepper at any given point by means of selector switches, any number of additional running speeds, such as jog forward, jog reverse or run-out can be very easily obtained and selected by the operator.

* * *

The stepping switch control also permits preselection of initial torque so that the take-up reel can be made to rotate immediately when the "Run" button is pushed regardless of the load conditions. This contrasts very favorably with the capacitor type of control where an appreciable time is required to build up the necessary rotating torque after the "Run" button is pushed. In the case of the 450# reel unit mentioned above, with the long acceleration rate that is required in order to bring this reel up to a running speed of 5000 ft/min. with a reasonable HP motor it would have required some 4 or 5 seconds for the reel to begin rotating after the "Run" button was pushed with the capacitor type of control. This would have introduced an operating difficulty, since when operating with heavier wire tensions, the dancer would have begun to drop immediately when the "Run" button was pushed and might even have reached under extreme conditions, the "Emergency Stop" position at the bottom of the dancer column before the take-up motor had started to rotate. This need not occur with stepper control.

* * *

Another advantage of the new control system over capacitor control is that the time required to reach any given running speed is proportional to that speed. In other words, if the maximum running speed is 2000 ft/min., and the controls are set to reach that speed in 5 seconds, then only 2½ seconds will be required to reach a preset running speed of 1000 ft/min. With capacitor control, the same time, i.e., 5 seconds, would be required to reach any preset running speed, no matter how low.

* * *

Another excellent feature of the stepping switch control is the fact that the automatic acceleration can be interrupted by means of an electronic-current relay whenever a predetermined motor current is ex-

ceeded. Under these conditions, the advance of the stepper is interrupted until the motor current has dropped again to a safe value. This latter feature, would, of course, permit a completely automatic acceleration in which the stepping of the acceleration relay would be controlled entirely by the motor current. Such automatic acceleration has been in use on our electric railways and rapid transit systems for some time. It was found to be the most efficient of all acceleration systems.

* * *

The only drawback to the stepping relay control is that it gives a point-to-point control rather than an infinitely variable control such as would be obtained with either a motor-operated potentiometer or a capacitor system. This factor is, however, of no importance when as many as 25 steps are used in the acceleration. Here the steps are so small, that acceleration is indistinguishable from that of a continuously variable system. It would be an extremely simple and very inexpensive matter to increase the number of steps to 50 or even 100 if the necessity ever arose.

* * *

The constant-wire-speed feature on any given control step is obtained by feed-back from a D.C. tachometer generator. This, in itself constitutes no new control feature, but on the new Re-reeler, not one, but three tachometer generators are used, two external and one internal.

* * *

A dancer is used, for reasons discussed later, and the functions of the take-up and pay-off motors (lead and slave) are interchanged when the Re-reeler is operated in the reverse direction. Thus a control tachometer generator is required each side of the dancer in order that runaway be prevented by having a generator that will start moving immediately when the wire starts moving, whichever the direction of rotation. It is obvious that wire on the pay-off side of the dancer might not start to move for an appreciable period after the take-up has started, and in any event, a generator on the pay-off reel side of the dancer could not be used to control speed satisfactorily.

In addition to the two external generators required for 2-direction operation, a third (internal) generator is used when jogging to prevent runaway speed when winding up wire which may have been pulled out onto the floor to straighten out a tangle due to a poorly wound pay-off reel or to examine a faulty stretch of insulation. In this event, neither of the two external generators are effective.

* * *

Now let us consider the control of the pay-off reel motor.

* * *

When we are dealing with wire speed on the pay-off end of a Re-reeler, which may change almost infinitely fast, due to poor wind, then we have no choice but to use a wire reservoir such as a dancer to absorb the rapid changes of speed in order to allow the use of a reasonable size of motor to drive the pay-off reel. From fundamental physics, we know that it requires infinite power to accomplish infinite change of speed. To attempt to wind from a poorly wound reel to another reel at high speed without a dancer and to still maintain wire tension in the area of plus or minus 10 per cent is a practical impossibility.

* * *

On the Re-reeler, as stated above, the Pay-off motor is the slave. It is controlled completely by the dancer.

* * *

The problem here is to provide accurate control without detrimental hunting, using a minimum of control equipment and particularly to eliminate the necessity on the part of the operator to juggle several potentiometers to keep the system in control.

* * *

It was found also to be very desirable to eliminate all potentiometers and rheostats on the dancer column as these items are fragile at best and can receive very rough treatment if the wire should snarl and break allowing the dancer to fall free through the control elements. These elements also receive this rough treatment whenever the wire runs out on the pay-off reel.

* * *

In our new control system we have found it possible to eliminate potentiometers and rheostats from the dancer column by using a newly devised photo-electric system which allows perfectly smooth variation of eddy-current clutch excitation on the pay-off end from zero to maximum. To accomplish this, the dancer motion is reduced from 60 inches to 9 inches by means of a small gear reducer mounted on the top of the dancer column. The control element which rises and falls the 9 inches is a piece of opaque, rigid vinylite cemented between two pieces of transparent rigid vinylite. The opaque piece can be mathematically laid out and cut to shape with scissors to give the incidence of clutch excitation at any point whatever of dancer travel and the control of the increase of the excitation can then be made to follow any torque curve to the point of maximum excitation which can again be made to occur at any given point of the dancer travel.

* * *

It might be well to add, at this point, that in addition to controlling the torque of the pay-off motor this same dancer arrangement is made to control the excitation of a magnetic friction brake as well, by means of a second strip of laminated plastic, which is mounted beside and moves with the strip controlling the clutch.

* * *

The magnetic brake on the pay-off end of the equipment, as well as a similar brake on the take-up end of the equipment are required in order to obtain the necessary stopping times for both controlled stop and emergency stop. Use of these brakes permits a controlled stop of some 1/3 to ½ the time required by either regenerative, dynamic or eddy-current-clutch braking. They permit an emergency stop in 1/6 to 1/10 the time required by the other braking methods. Another reason for using the magnetic brakes is that neither regenerative, dynamic, nor eddy-current-clutch braking systems have any braking effort when the elements are at standstill. Use of the magnetic friction brakes also eliminates the necessity of constant plug-reversing and stopping the motors whenever the wire line is stopped.

Getting back to the dancer, in addition to the two variable photo-electric controls, the dancer is equipped with rugged limit switches near the end of its travel at both top and bottom. The bottom switch is used to apply emergency braking whenever the dancer drops due to wire breakage or wire run-out. The upper switch is used to prevent wire stretch or breakage if the dancer ever gets close to the top of its travel, due to a very badly wound reel on the pay-off end. When the dancer hits this upper switch, slight braking is applied to the take-up reel in order to bring its speed in line with that of the pay-off reel at that particular moment.

* * *

Another unique feature of the dancer control is the use of a zero speed switch on the top of the dancer column which permits the pay-off motor clutch to be energized only while the dancer is rising, never when it is either at standstill or falling. The other contact on this zero speed switch likewise permits braking torque to be applied to the pay-off reel only while the dancer is falling and never while it is at standstill or rising. These conditions, as far as braking is concerned, apply only while the machine is in operation, not when it has reached a complete stop. Use of the zero speed switch eliminates detrimental hunting without the use of complicated and expensive electronic circuits.

* * *

With this dancer control, the reeler can be pushbutton-operated with either light wire, heavy wire, full reels, empty reels or anything in between without the necessity of adjustments by the operator.

* * *

It is also interesting to note in passing, that although no particular attempt is made to maintain tension-control during emergency stops which, by the way, can be accomplished in about one second from 2000 feet-per-minute to standstill, the efficiency of the braking system and the dancer control are such that an emergency stop can be made almost invariably without either stretching or breaking the wire.

* * *

As we have indicated previously, this particular Re-reeling machine must operate in reverse as well as forward. The reason for this is that it is a completely automatic Spark Testing unit which when it finds a fault in the insulation, comes to a controlled stop and then immediately reverses automatically and runs slowly backwards until the fault is in the first few inches of the Electrode Unit. At this point, it again comes to a stop and signals an operator that a fault has been located and is ready for inspection and patching. In order to accomplish this reversing, the motors are plug-reversed and are, therefore, running in the reverse direction by the time the wire has come to rest. When an operator notices a fault indicating lamp lighted on any one of the several Reelers which he may be attending, he proceeds to that machine and jogs the fault out of the Electrode Unit. If the fault is not immediately visible to him, he may reverse-jog the wire back into the Electrode and then jog it forward again out of the Electrode, watching carefully to note the exact position of the fault as shown by the spark as the fault emerges from the Electrode Unit. This operation can result in a considerable number of succeeding jog-forwards and jog-reverses. On previous machines this led to a rapid overheating of the motors and operation of the overload trips. In the new control system, this heating has been very materially reduced by the use of starting resistors in the motor circuits which are cut into the circuit every time the motors stop and which are then automatically cut out again about one second after the motors have started in either direction. Use of these resistors with their associated electronic timer reduces the peak current very materially and makes it possible to successively plug-reverse the motors some 15 to 20 times without tripping the overloads, contrasted with the 4 or 5 times that was possible without the use of the resistors.

* * *

Another interesting control feature of the new Re-reeler is the method of assuring that all insulation faults are located. When the machine is running at high speed and a fault is located, the machine comes to a controlled stop. This requires approximately 5 seconds and, therefore, a considerable footage of wire will have passed through the Electrode Unit before it comes to a standstill. When the machine reverses, the first fault into the Electrode in the reverse direction again stops the machine. There is, of course, the possibility that this fault may not be the first fault located in the forward direction, but may be the last of one or more faults which may have passed through the Electrode as the machine was coming to a stop. In order to prevent an operator from missing any faults, a footage counter which had been standing at zero is instantaneously clutched in when the first fault is located. This counter then counts the footage of wire which passes through the Electrode Unit until the machine has come to a full stop. The counter then begins to subtract as the machine reverses and when it finally comes to stop with a fault in the proper position in the Electrode Unit, then the operator can tell by a glance at this counter whether the fault in the Electrode was the original fault or a successive fault by noting whether the counter stands at approximately zero or at some given footage. If the counter is not at zero, then the operator, as soon as he has repaired the first fault, jog-reverses the wire until the second fault enters the Electrode Unit. This process is repeated until the counter has passed through zero. When this occurs, the operator knows that all the faults have been located and patched. When the operator pushes the "Run" button to resume operation, the fault localizing counter is automatically reset at zero.

* * *

Another control feature installed on these machines is a photo-electric stop device which brings the machine to a stop when there is only one layer or so of wire left on the pay-off reel. This prevents the whipping and slashing around that occurs whenever the wire runs out on the pay-off reel and around the dancer at the normal operating speed of 2000 feet-per-minute. It also makes it possible for the op-

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Sintered Tungsten Carbide Dies in the Wire Industry

by Edgar T. Miller
Manager, Wire Die Sales
Firth Sterling, Inc.
Pittsburgh, Pennsylvania

This paper was presented at the Annual Convention of The Wire Association on November 16, 1960, at Chicago, Illinois.

There is no mystery connected with the production of Sintered Tungsten Carbide, but the performance of Sintered Tungsten Carbide since its introduction to the Wire Industry has been phenomenal.

* * *

Tungsten Carbide was discovered by a French chemist, **Henry Moissan,** in 1893 during a search for a method to produce artificial diamonds. However, Tungsten Carbide was not used for wire drawing dies until much later.

* * *

It was during World War I that the Germans, in dire need of a substitute for diamond dies, were able to produce Sintered Tungsten Carbide inserts which they used for wire drawing dies.

* * *

Sintered Tungsten Carbide dies were introduced into the American Wire Industry in the early twenties. However, it was about 1928 before they began to be used extensively and in about five short years almost every major producer of round wire had completely converted to Sintered Tungsten Carbide wire drawing dies.

* * *

History reveals that no product has ever replaced another product so quickly and so completely as the Sintered Tungsten Carbide wire drawing die replaced the chilled cast iron die. To add to the wonder of this change, it was accomplished during the worst depression ever known in the United States of America and at a price about 8 to 10 times greater than the price at which dies are purchased today.

* * *

Machine builders recognized the possibilities of greater speeds and continuous drawing on multiple blocks through the use of the Sintered Tungsten Carbide dies. Soon machines of various combinations of blocks appeared on the scene and today you can find ferrous wire being drawn at speeds ranging up to 3500 feet per minute and even greater speeds on non-ferrous wire. It would be well to add something here about speeds common with other die materials. The speeds which are common today are at least 6 times those which were in common use prior to the advent of the carbide die. Also, the production of wire per hole with carbide is many many times that which could be obtained through chilled iron and other dies previously used. These factors make it impossible to consider the use of anything except Tungsten Carbide in a modern wire mill.

* * *

At the very outset of the application of Sintered Tungsten Carbide dies in the Wire Industry it was evident that some standardization of a series of insert sizes would be desirable due to the wide range of wire sizes to be drawn. This standardization was worked out and established on an industry basis, approximately 25 years ago. These standards have been equally important to Purchasing Departments and to the Die Room personnel. Carbide insert sizes are interchangeable so that Die Room finishing practices are greatly facilitated.

* * *

How practical this standard is has been proven by its continued use over more than 25 years with but one major change in design. This change was an increase in nib height made necessary by the addition of the rough cored back relief in the die some twelve years ago.

* * *

Since Sintered Tungsten Carbide dies were introduced to the American Wire Industry from Europe, it was natural for them, also, to supply us with equipment for finishing and maintaining the dies. This equipment was designed after diamond die finishing equipment and soon proved to be inadequate for the larger and heavier carbide dies. Several American companies began designing and manufacturing heavier and faster equipment for finishing and maintaining Sintered Tungsten Carbide wire drawing dies.

* * *

Two very important and necessary machines are the Heavy Duty Ripper and the Semi-Automatic Polisher. The Heavy Duty Ripper is used for rough drilling the approach angle, particularly on used dies that are worn oversize which are to be recut to a larger size or on dies that require the angles to be increased. This rough drilling operation shortens the bearing and removes the wear ring from the dies very economically.

* * *

The abrasive used is silicon carbide mixed with kerosene. The Semi-Automatic Polisher is used to polish the approach angles after the rough drilling operation and also to remove wear rings from used dies that are not worn oversize. The abrasive used is diamond dust.

* * *

The inside contour of a standard wire drawing die has a radius bell opening, an entrance angle blending the bell into the approach angle, a bearing, and a back relief

angle. The simplicity of this design can be misleading. Actually, a wire drawing die is a precision tool used to produce round wire to close tolerances and with various degrees of finish. It is obvious that there must be a great deal of refinement to the basic design depending upon the different types of material to be drawn.

* * *

Since it would not be possible to cover all the designs used in wire drawing, we will consider a few items and be specific as to their design and why. By this, a pattern will be established which will be a guide to various designs required to perform other specific operations.

* * *

Dies for drawing stainless steel wire should have a 16 degree included approach angle with a medium bearing length. The intersection of the approach angle and the bearing should be as sharp as it is possible to get. To get this line sharp, it is advisable to do all the polishing on the approach angle before sizing the die and the die should be sized from the back. The reason for keeping a sharp intersection between the approach angle and bearing is to keep the steel moving until it has reduced small enough to go through the bearing thus eliminating any chance of galling or scratching the wire.

* * *

Dies for drawing high carbon spring wire will be finished essentially the same as dies for drawing stainless steel wire with these exceptions. The intersection of the approach angle and bearing should be blended slightly, just enough to take the sharpness away. The approach angle should be tighter, probably a 12 degree included angle. When dies which have too great a blend between approach angle and bearing are used for drawing high carbon spring wire, the wire drawer often has undue trouble attempting to get the proper cast on the coil of wire.

* * *

Dies used for drawing low carbon wire, such as nail wire, coat hanger wire or welding rod wire, should have 16 degree approach angles and medium length bearings with the intersection of the approach angle and bearing blended. A sharp intersection on dies used for drawing low carbon wire are likely to produce out-of-round wire.

* * *

Dies to be used for drawing copper wire should have 16 degree approach angles and medium length bearings with the intersection of the approach angle and the bearing well blended. If the draft is light, such as is common on shaver heads, it is advisable to increase the bearing length to a long bearing and blend well.

* * *

Dies used for drawing aluminum wire should have 16 degree angles for wire up to ¼" diameter and long bearings, 75 to 100 per cent of diameter. One-third of the bearing should be blended into the approach angle until you cannot see where the bearing begins nor where the angle ends. The reason for this extreme blending is that the material being drawn is very soft and will not stand being drawn over any abrupt contours which may tend to cause the metal to pile up and thus scratch the wire.

* * *

The reason for using long bearings for drawing aluminum wire is that the dies rarely wear oversize on the bearing, these dies do develop bad wear rings in the approach angle. The long bearing will allow the dies to be repolished several times before the bearings become too short and have to be recut to the next larger size.

* * *

It will be clearly seen from the examples that the harder the material drawn, the sharper the line between the approach angle and the bearing; and the softer the material drawn, the greater the blend must be.

* * *

Dies used for drawing galvanized wire should have very tight angles, probably 8 degrees included with very short bearing or no bearing at all. These dies should be sized from the back by putting an 8 degree angle on top of the 90 degree back relief. With a little practice, diemakers become very good at getting dies on size with this method.

* * *

Dies used for drawing mechanically descaled wire should have large approach angles. Twenty-two degree angles are recommended for first hole dies. This large angle permits plenty of soap to get into the die with the wire and still allows room for the scale and dust to back out of the dies. It is recommended that R-4 dies be used on this operation. This extra nib height, allowing a longer approach angle, is very desirable.

* * *

Second and third draft dies should have 18 degree angles and short bearings, probably 20 to 40 per cent of the wire diameter. The finish die should have 16 degree angles and 50 per cent bearings.

* * *

Some failures encountered in wire drawing are a direct result of the dies and we want to consider some of these problems too.

* * *

For instance, we quite frequently have trouble in drawing bright wire or plating wire. Many times the direct cause of such wire turning out to be dull or gray is the fact that the bearing in the die is too short. A short bearing will allow grease to go through the die while a long bearing (60 per cent) and blended only enough to draw round wire will burnish the wire. A failure which should always cause an examination of the entire train of dies is low torsions on rope wire. A bad wear ring in any die in the train will cause low torsions.

* * *

As a matter of fact, probably the greatest sin in the die business is using dies with bad wear rings in the approach angles. An examination of wear rings will reveal the reason for this statement.

* * *

When a wear ring begins to form in the approach angle, it is a uniform depression. This is true until the ring begins to get deep enough to start scraping the lubrication off the wire. Then the wear ring begins to be rather sharp at the exit side of the draft. When this happens, the coating and lubrication both are scraped off the wire and lines begin to pull through the bearing causing damage to the wire also causing dam-

age to the following dies in the train.

* * *

Experience has revealed that proper maintenance of dies can increase their performance as much as 200 per cent.

* * *

By proper maintenance we mean polishing the wear ring out of the dies before it gets bad enough to ruin the size of the bearing.

* * *

A very bad practice is to allow a sharp line to remain at the top of the approach angle. This happens when the die has been recut several times without opening the entrance angle. This sharp line hinders lubrication from getting into the die and will often scratch the wire causing great damage to the wire and to the rest of the dies in the train.

* * *

The question is often asked, "Is there any equipment for measuring bearing lengths?" Actually, there is none available commercially. Some have built a device of their own which is used to determine bearing length. These gadgets are expensive and their complete accuracy is questionable.

* * *

It is the opinion of many, and we share that opinion, that complete accuracy of bearing length is not worthy of expensive equipment. We believe that bearing lengths can be classified as long, medium and short and be entirely competent to meet the requirement for bearing lengths in most wire sizes. Where complete accuracy is required for bearing length, it is advisable to calculate the meeting point required to produce the bearing length desired. A chart for this calculation is furnished by the supplier of dies free upon request. In the case of bar and tube drawing dies, we are concerned with diameters large enough to enable us to make scale measurements.

* * *

Probably the most used method for determining bearing length is visual inspection with a plug gauge. This is accomplished by inserting the plug gauge into the approach angle and examining the die from the back to determine the bearing length. This plug gauge is the same diameter as the size to which the die is to be finished. The plug gauge will stop at exactly the point where the bearing meets the approach angle, the only requirement being that the plug gauge be exactly square and on size.

* * *

Every wire mill die room should have a complete set of well kept plug gauges starting with the smallest size wire produced by that mill and in increments of .001″ to the largest size wire produced.

* * *

A diemaker can, with experience gained by daily use of this method, determine with sufficient accuracy bearing lengths for average requirements. A question often asked, and on which there has been a great deal of controversy, "Does a very high polish on the approach angle of a die give better die life?" First, if very high polish means lustre only, the answer is "No." Second, if very high polish means that the approach angle has been polished until the angle is absolutely smooth and all the tool marks of the rough drilling have been removed, regardless of lustre, the answer is "Yes."

* * *

Sintered Tungsten Carbide is very dense material and certainly the smoother the surface of the approach angle, the less friction and heat generated contributing to better lubrication and consequently, better die life.

* * *

I would like to make mention of one interesting development in the wire drawing business. This has to do with the use of revolving die holders. There are several reasons why this development is interesting to wire mill people.

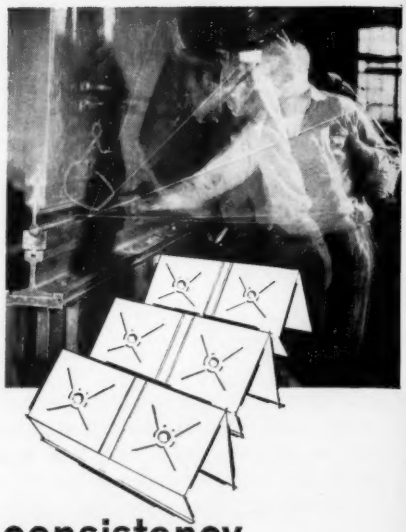
* * *

For instance, the people at Westinghouse Electric, Montevallo, Alabama, where this process is used, figure that die life alone has been increased by at least 300 per cent.

* * *

This is no doubt due to the breaking up of frictional resistance in the die to facilitate passage of the wire. In addition, the Westinghouse people claim that the

(*Please turn to page* 1719)



consistency...

Consistent, *predictable,* results throughout production processes must begin with the consistent quality of materials. J & L consistent quality stainless steel will give predictable results time after time...order after order.

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Stainless Steel

American and European Steel Wire Manufacturing — A Comparison

by Raymond S. Worth
Manufacturing Manager
Steel Wire Mills Division
John A. Roebling's Sons Division
The Colorado Fuel & Iron Corporation
Trenton, New Jersey

During the first half of 1959 my employer, through correspondence with members of a Wire Manufacturing concern in Great Britain became interested in a wire processing method which the latter had developed. It was decided that representatives from our Company should be sent to England to observe the operation of the process and obtain detailed information and it was my good fortune to be selected as one member of a two-man team to make the trip.

* * *

With our Mills idle, due to labor difficulties, we were afforded the opportunity to extend our itinerary and visit additional Wire Mills in England and in several of the countries in Western Europe.

* * *

For many years, it has been our practice to welcome visitors from foreign Wire Mills who wished to visit our plant and this has resulted in establishing very friendly relationships with a large group of executives and engineers in Wire Mills in many countries. When we proceeded to make arrangements for our trip, these established acquaintanceships proved to be extremely valuable.

* * *

Due to the length of time allotted for the trip, we found it necessary to limit the number of plant visits which we wanted to make. Then, in an effort to realize the greatest return, we endeavored to select those plants which were chiefly concerned with producing the same types of finished products that we manufacture — namely Rope Wire and various other special high carbon grades of wire.

* * *

With our list of selected plants determined and a tentative itinerary and time schedule laid out, we wrote to the various Plant Managers or other executives, with nearly all of whom we had had previous contacts. We stated our desire to visit their Plants and estimated the dates of our proposed arrival. Without exception, the replies we received were extremely gratifying and we were assured that we would be welcome. Throughout our whole trip, our hosts were more than generous with their time and information. In many instances, in addition to affording us an opportunity to visit their Mills, we were entertained at their homes and conducted on tours of historically interesting places.

* * *

As finally arranged and carried out, our route led us into seven Countries — England, Austria, Germany, Belgium, Italy, Switzerland and France. Visits were made to sixteen Wire Mills, five Research and Development Laboratories and one Machinery Manufacturer. We were greatly disappointed at having to miss seeing many more plants but time would not permit more calls.

* * *

It is impossible in this discourse to recount in detail the many interesting practices, processes and production equipment units which we were given the opportunity to observe. Also, it would be unethical to discuss or make comparisons of details which were divulged to us more or less in confidence. Therefore, while it will detract from the value of this paper, it will be necessary to state only generalities.

* * *

It must be remembered that, just a few years ago, a great many European factories were severely damaged—some almost completely destroyed, in World War II. Then, following that event, the economy of the countries involved was in very bad shape for many years. So handicapped, money to finance the rebuilding of factories was in short supply. However, though the rate of rehabilitation was very slow at the outset, there has been a gradual acceleration and there was evidence that a tremendous job of rebuilding and expansion has been accomplished. In carrying out this program, basically sound planning has been employed. Almost without exception, we found that the

Raymond S. Worth

This paper was presented at the Annual Convention of The Wire Association on November 14, 1960, at Chicago, Illinois.
Mr. Worth studied Mechanical Engineering at the Worcester Polytechnic Institute. He was first employed in the wire industry in 1925 by the American Steel & Wire Company, moving later to the Wickwire Spencer Steel Company, then to Bethlehem Steel Company and finally to the John A. Roebling's Sons Corporation. In each plant he filled various positions on the operating supervisory staff and presently is manufacturing manager of the Steel Wire Mills Division of the company's Roebling, New Jersey, Plant.

He is a member of the Engineers Club in Trenton, the American Society for Metals and is a director and officer of The Wire Association.

Mills we visited were engaged in some degree of rehabilitation, modernization and expansion programs. In one instance an old mill was to be abandoned and a new, modern plant built at a more desirable location.

* * *

As is the case in America, the need for reduction in operating costs has been the vital factor in the promotion of plant improvement. Wherever possible, manufacturing areas were rearranged to straighten out material-flow lines and thereby reduce handling costs. In some instances, two or more processing operations were combined into a single operation. For example, several patenting, cleaning and coating units were in use, also continuous patenting, cleaning and galvanizing lines.

* * *

The scarcity and cost of acid, and the strictly enforced rules concerning allowable methods of acid waste disposal have made the standard method of hot rolled rod scale removal uneconomical. In many plants, means of mechanically removing scale were being developed and employed on major proportions of their output. The methods used varied widely and included shot blasting, roller scale breaking, and wire brushing.

* * *

The patenting equipment and methods which were in common use were essentially the same as those with which we process our material. This was also true of the batch-type wire heat treating practice.

* * *

In general, the wire drawing equipment in use was not radically different from the familiar types operated in American Mills. The continuous machines could be placed in three categories — the "straight-thru," the "accumulator block" or the "cone" types of equipment. It was noted in several instances, however, that these machines were designed to operate with lower per cent reductions of area per draft than we normally employ. It was claimed that this made it possible to obtain better die life and produce better quality of wire at higher finishing speeds.

* * *

With minor differences in one or two instances, the wire galvanizing units were essentially similar to those which we operate.

* * *

The development of auxiliary equipment attached to the various wire processing units, to permit the production of heavy coils — or reels — was in progress in nearly every plant. Package sizes up to 4,000 lbs. each were being produced.

* * *

Work loads assigned to machine operators varied widely from one locality to another. In many instances we found that they equalled or even exceeded the average for the industry in our Country.

* * *

Material costs were stated to be somewhat higher than is the case in America. However, in our opinion, this is more than offset in final production cost by the fact that the labor cost in Europe is so low. It is estimated that in the Wire Mills, the average labor cost — wages plus social benefits and taxes — there would average approximately one-quarter to one-third as much as the average in our Wire Mills.

* * *

In every instance where we were afforded the opportunity to make comparisons, either by inspection, or perusal of test records, we found that the quality of the material being produced equalled our familiar standards.

* * *

We were greatly impressed with the amount of Research and Development work that was in progress in both independent laboratories and in plant laboratories. There was ample evidence that the technical staffs were well trained and capable.

* * *

To summarize our observation of European Wire Mills we can set forth the following:

1. **They have capable, progressive and aggressive Management Staffs.**
2. **Management is capably assisted by the support of trained engineering staffs.**
   - **Mechanical Engineers**
   - **Metallurgical Engineers**
   - **Industrial Engineers**
   - **Research and Development Engineers**
3. **Rehabilitation programs are gradually improving, diversifying and expanding their output potential.**
4. **The quality of their products is excellent.**
5. **Low labor costs give them an advantage over American manufacturers.**
6. **With this advantage they can profitably participate in the American market and, with the opening of the St. Lawrence Seaway, not only on the Eastern seaboard but also in the Mid-western area.**

* * *

A close look at the foregoing points brings to mind the following old adage, "Never underestimate the ability of your competitor"! Certainly this is true in our field today.

* * *

Without attempting to pose as experts on economics or trying to prophesy coming events, it can be stated that it should be obvious to all of us in the Wire Industry in America that we must "pull out all the stops" if we are to maintain our position in our chosen field.

* * *

In conclusion our trip was most enjoyable, interesting and instructive and we are sure that many of the things we learned will prove to be of value to us and to our employers. It is our sincere belief that more trips of a similar nature should be undertaken.

THE WIRE ASSOCIATION

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RICHARD. E. BROWN

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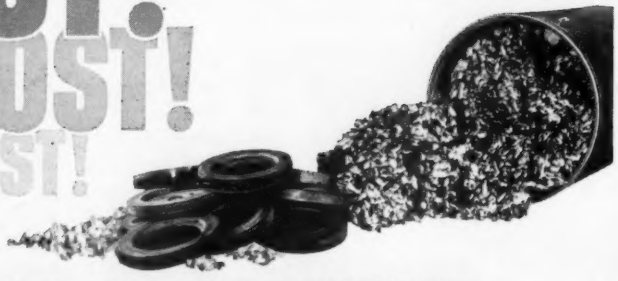

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New Developments in Copper Wire Rod Mills

by M. M. Feuer
Sales and Project Engineer, Loewy Rolling Mills
Baldwin-Lima-Hamilton Corp.
Industrial Equipment Division
Philadelphia, Pennsylvania

In this article the author outlines the mechanics, economics and capabilities of modern wire rod rolling equipment.

For the production of wire rod, preparatory to the wire drawing operation, the rolling mill has historically proven itself to provide the greatest economy and highest quality. A rolling mill is a high-output tool and the common feeling has been that an installation can only be justified for very high quantity requirements and for mill operation on a sustained schedule. New developments in copper wire rod mills indicate that a mill installation can be economically feasible for lower quantity requirements and for starting operation on a one shift per day basis. These new developments are provided in two new mills (see schematic drawings). A fresh approach, technically, to rolling copper rod is represented in the planning and design of these plants.

* * *

The first mill of its type (Mill A) has been in operation since 1955. The second mill of this type (Mill B) for lower capacity than Mill A, is now under construction. A third mill (not shown) is in the planning and design stage.

* * *

The mills shown represent a successful technical break-through in the rolling of copper rod, in the main, because of the incorporation of continuous finishing stands producing high-quality rod. Prior to these mills, the installations consisted mainly of looping, or Belgian stands. The looping stands require tong men, or catchers, to loop the hot rod running at high speed between strands. This job is highly hazardous and strenuous, entailing great difficulty in training and keeping men to operate the mill. Each man on a looping operation must be spelled, as it is not feasible to work at this job eight hours a day.

There is a limit to the rod speed that a catcher can handle, and therefore, for a looping mill train double stranding must be resorted to for lower rates of production, as compared to a continuous mill where the bar is delivered automatically between stands, and where the speed of the bar is not limited by the human skill required to catch and enter a rapidly traveling hot rod. Mechanical loopers, or repeaters, to loop the rod between strands in a looping mill have been developed to a respectable degree of efficiency. However, for the smaller oval section manual looping is still required. In addition, looping channels and floor area for the development of the loops, which is not required in a continuous mill.

* * *

The principal objectives in planning these new mills were: minimized capital expenditure, high degree of automation, and high-quality product. The continuous finishing mills inherently provide means for a high degree of automation and also provide a compact layout with minimum building and land area, as well as elimination of repeaters and looping channels. Thus, in this respect, improved technique works hand in glove with keeping down capital investment. Special attention to the planning of the roughing operations, improved pass design, and high-speed finishing without tension or excessive looping between stands, all have contributed to high quality product.

* * *

For both plants the standard copper wire bar is rolled to 5/16″ diameter rod in 14 passes. The roughing passes are taken in 3-high mills with automatic manipulating tables to transfer the bar between passes. In the 3-high mill, the bar to be rolled passes back and forth between the mill rolls. The bar goes in one direction between the middle and top roll, and in the other direction between the middle and bottom roll. Thus, while the bar reverses in direction, the mill motor rotates in only one direction so that an a-c motor can be used for this drive.

* * *

The finishing passes are taken in 2-high continuous mill stands. The bar is rolled simultaneously in the several stands and d-c drive motors are controlled to provide rolling without tension in the rod and without excessive looping between mill stands.

* * *

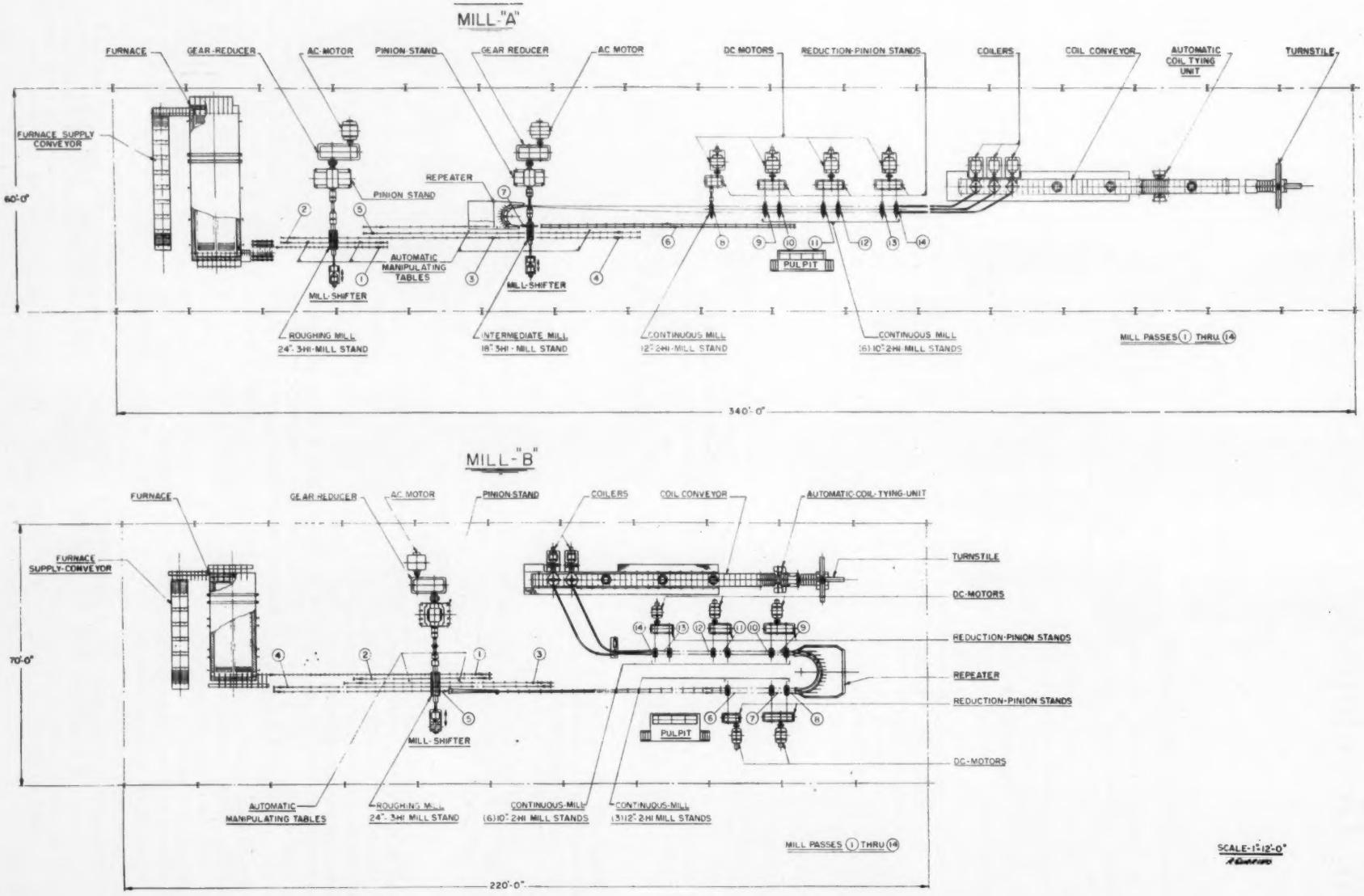
The typical mill design and layout incorporated in the concept of these mills offers advantageous features as follows:

A large 24″ diameter 3-high roughing mill is provided to ensure automatic operation with easy entry of the bar into the mill. Selective turning of the wire bar by an operator at the entrance to the mill is no longer necessary.

The large diameter rolls in the roughing mill and optimum utilization of roll face, provide good roll economy and minimize down-time for changing rolls. Because of the type of pass layout, four rolls are equivalent to two sets in this mill, vs. the usual six rolls to two sets. Most roughing mills were formerly about 17″ to 18″ in diameter. An 18″ diameter roughing mill does not have sufficient roll bite to provide the reliability required for automatic operation.

The large 24″ diameter mill will bite larger sections, allowing heavier bars to be rolled. This results in fewer welds at wire drawing, improving efficiency.

The bar is turned 90° at every


MILL "A"
FURNACE
GEAR-REDUCER
AC-MOTOR
PINION-STAND
GEAR REDUCER
AC MOTOR
DC MOTORS
REDUCTION-PINION STANDS
COILERS
COIL CONVEYOR
AUTOMATIC COIL TYING UNIT
TURNSTILE
FURNACE SUPPLY CONVEYOR
60'-0"
REPEATER
PINION STAND
AUTOMATIC MANIPULATING TABLES
MILL-SHIFTER
MILL-SHIFTER
PULPIT
ROUGHING MILL 24"-3HI-MILL STAND
INTERMEDIATE MILL 18"-3HI-MILL STAND
CONTINUOUS MILL 12"-2HI-MILL STAND
CONTINUOUS MILL (6) 10"-2HI-MILL STANDS
MILL PASSES (1) THRU (14)
340'-0"
MILL "B"
FURNACE
GEAR-REDUCER
AC MOTOR
PINION-STAND
COILERS
COIL CONVEYOR
AUTOMATIC-COIL-TYING-UNIT
FURNACE SUPPLY-CONVEYOR
70'-0"
TURNSTILE
DC-MOTORS
REDUCTION-PINION STANDS
REPEATER
REDUCTION-PINION STANDS
DC-MOTORS
MILL-SHIFTER
PULPIT
AUTOMATIC MANIPULATING TABLES
ROUGHING MILL 24"-3HI MILL STAND
CONTINUOUS-MILL (6) 10"-2HI MILL STANDS
CONTINUOUS-MILL (3) 12"-2HI MILL STANDS
MILL PASSES (1) THRU (14)
220'-0"
SCALE-1:12'-0"

pass by automatic manipulating tables in the roughing mill to provide improved working of the metal, and superior quality.

* * *

Ragging of rolls is not required in the 24" diameter roughing mill.

* * *

A minimum of two sets of grooves for each pass in the roughing mill provides roll economy, and permits greater time between roll changes.

* * *

A roughing mill stand shifting device is provided to transfer the roughing operation from the worn set of passes to a new set of passes in the same rolls, with minimum adjustment and minimum unproductive time. When one set of grooves is worn, the bolts fastening the mill stand are quickly loosened and a device shifts the entire mill stand, so that the tables are in line with the new grooves in the rolls. The mill stand is re-fastened to the shoe plates, and production is quickly resumed.

* * *

Switching and guiding equipment for the continuous finishing stands is provided for running on a minimum of two tracks, even though the rated production of the mill requires only single stranding. This makes possible carrying single stranding to its limit without the possibility of interference between front and back ends of the bar.

* * *

Continuous finishing mill stands are provided, with each stand taking one pass.

* * *

The mill has automatic coilers with low inertia for minimum recovery time.

* * *

Roller bearings are used in all mill stands to decrease power consumption.

* * *

The utilization of the continuous finishing mill provides an automatic, modern, compact, trouble-free layout.

* * *

The mill incorporates an automatic coil-tying machine to decrease required personnel.

The mill incorporates improved pass design, adapted to this new type of layout.

* * *

The mill must work as a coordinated unit with the furnace, and great care has been taken in selecting the furnace design. Formerly, most copper mills have utilized the pusher-type furnace. For the newer type copper mill, however, the walking beam furnace provides the best answer to automatic operation and coordination with the mill. A well designed walking beam furnace offers the following features:

The mill can start operation on a one shift per day basis, and the furnace can easily be emptied at the termination of the shift.

* * *

The furnace is designed with small side entry and side discharge openings, which lends itself to good atmosphere control and good thermal efficiency.

* * *

Bars are heated uniformly throughout.

Scoring of bars, as with pusher-type furnace, is not a problem.

* * *

The wire bars being rolled, which are trapezoidal in section, all go through the furnace in the same position.

* * *

An entry conveyor with about one-half hour's capacity of wire bars is provided at the entry side of the furnace, so that, if the furnace operator is busy elsewhere, the mill continues to roll without interruption.

* * *

The furnace is very adaptable to automatic handling of the wire bar and is easily adjustable for different size bars.

* * *

The furnace lends itself to a compact plant layout.

* * *

Operation of the mill requires a man at the furnace, a man at the pulpit, and a man to remove the finished coils by lift truck from the turnstile. The duties are not arduous, so that spelling of mill operators is not required.

* * *

The experience obtained from the operation of Mill A and planning Mill B indicates that an economic study might prove valuable for rod quantities heretofore considered too small for a mill installation.

* * *

An economic study of a mill installation involves the following major items of capital investment:

A) Mill mechanical equipment

B) Mill electrical equipment

C) Furnace

D) Roll turning lathe

E) Pickling and copper recovery systems

F) Waste treatment system if required by location

G) Mill coolant system, with settling and coolant pond

H) Electrical, water, steam, compressed air, and fuel services

I) Building and crane

J) Building and equipment foundations

K) Erection and installation

L) Miscellaneous handling equipment and tools

M) Land

N) Engineering and architectural services

O) Storage Space

P) Spare Parts

* * *

The major items of conversion cost to be included in an economic study are:

1) **Direct Labor**
2) **Maintenance labor**
3) **Copper loss**
4) **Utilities**
5) **Roll replacement**
6) **Furnace repair**
7) **Supplies and miscellaneous maintenance**
8) **Overhead**
9) **Amortization and interest charges**
10) **Sales expense**

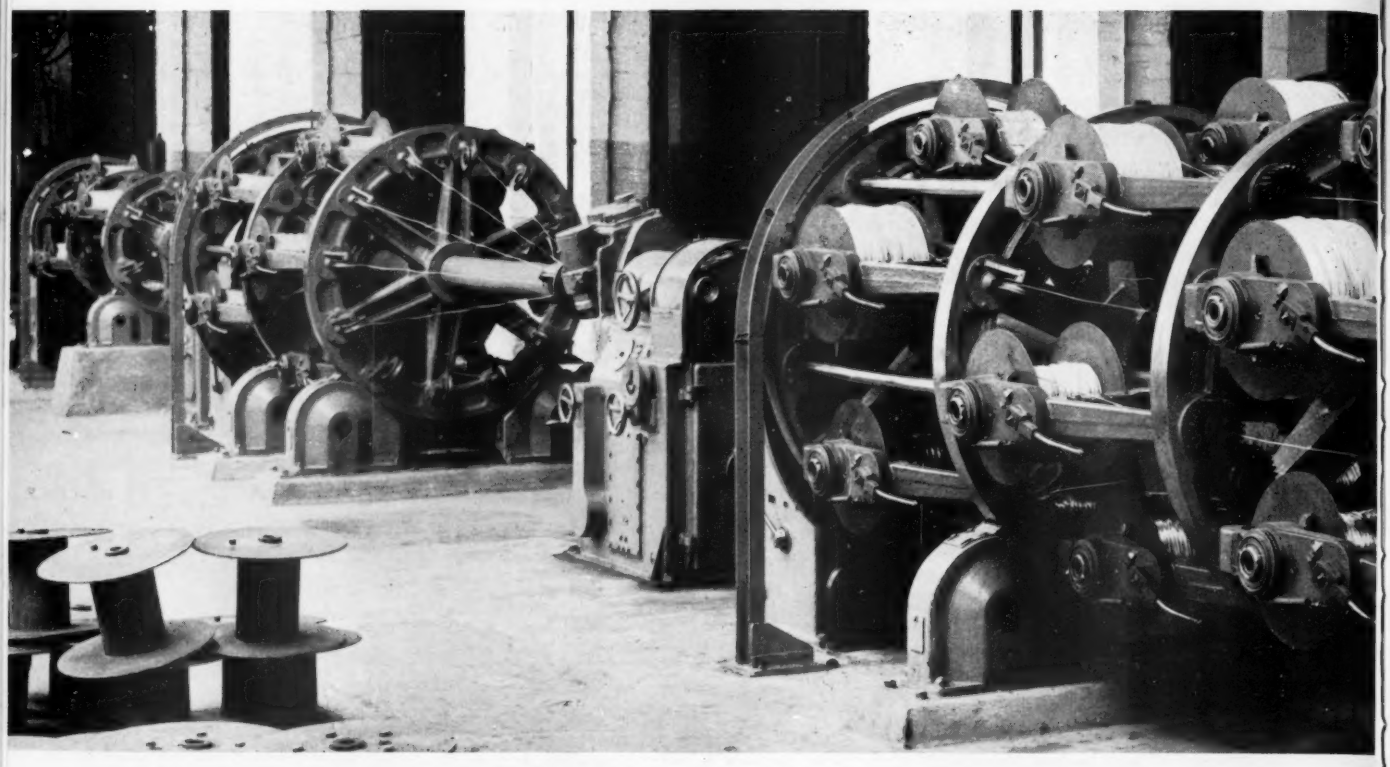
* * *

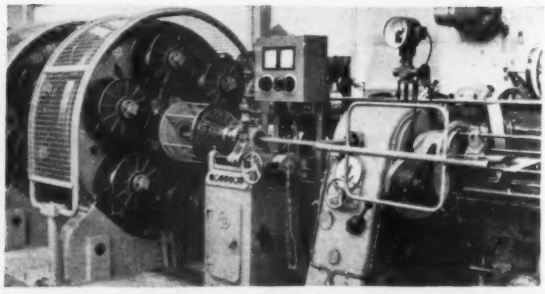
Depending on the situation of the operator of the mill, the various items of capital expenditure and conversion cost may be of greater or lesser importance. A plant utilizing the entire output of the mill may have a negligible sales expense and their present storage capacity may take care of the storage requirements of the new mill. Maintenance personnel may be shared by several installations at the same location, etc. Other non-tangible factors such as vertical integration, or close control of quality of the rod, may be important considerations.

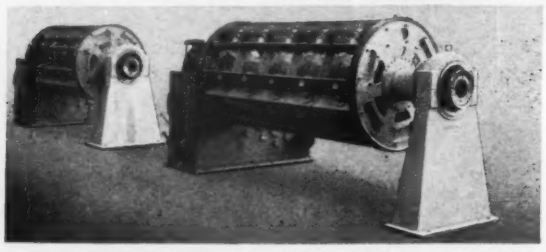
* * *

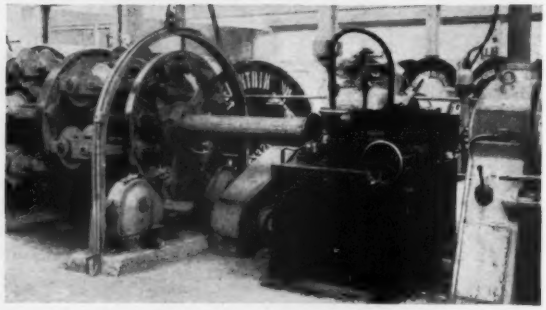
The two installations described herein are the results of the cooperative effort of plant operators, and the equipment designers and suppliers—of alert plant management on the lookout for new methods of cutting costs and of machinery builders constantly striving to provide plant operators with improved modern tools.

KRUPP









Cage Stranding Machines for Power Cables

Top:
Cage with bobbins arranged for back twisting

Left, top:
Cage with concentric bobbin arrangement

Left, center:
Cage with tangential in-line bobbin arrangement

Left, bottom:
Wire armoring cage with bobbins arranged for back twisting

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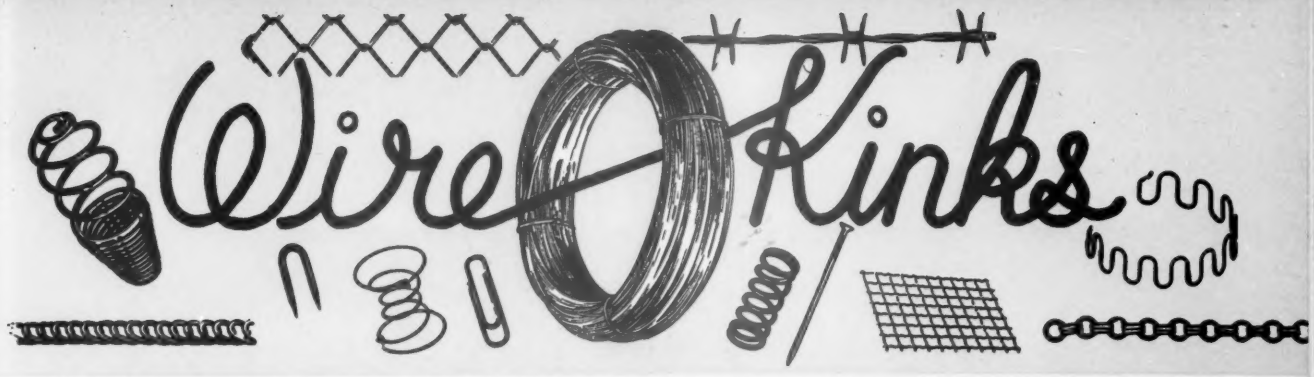


In this department will be published helpful hints on how to do things and the questions asked by our readers on wire processing problems, together with the answers and comments thereon received from the field. In no instance will the identity of the persons asking for advice or of those supplying it be published.

Our readers are invited to send helpful contributions and to submit questions on their technical problems to the Editor. These will be answered from information on hand or from the field, when it becomes necessary to secure counsel from that source.

Shot Blast De-Scaling

QUESTION

What are the many advantages and disadvantages of descaling rod by the shot blast method?

ANSWER

The matter of mechanical descaling, using the shot blast method, while not new, has only recently come into fairly wide acceptance. It is used more on the Continent than here, although in the last few years here the process has gained ground.

* * *

In the first place, it eliminates the need for a cleaning house with its attendant large capital outlay; secondly, it does away with the need for handling acids with their corrosive effects; thirdly, there is no problem as to the disposal of spent pickle liquors; and fourthly, the matter of hydrogen embrittlement of the steel does not exist, as no acid has to be brought into contact with the metal.

* * *

Much has been written in recent years on the economics of blast cleaning. One authority states that the cost, based on a month of operation during which data was collected, indicates that shot blast cleaning cost for 5/8" rod ran 43.2¢ per ton as against a cost of 98¢ per ton for pickling. The cost included direct labor, acid and time, in the one case and direct labor, shot, power maintenance, in the other.

* * *

Costs, however, will vary somewhat according to the size of the rod, number of strands used, etc. Equipment to clean up to 18 strands of rod are in use.

* * *

Shot blasted rod may be and often is fed continuously into a drawing machine without the intermediate steps of liming and baking, the wire receiving its lubrication in the conventional manner. One mill reports that the lubricant consumption on the average appears to be approximately the same for blast cleaned as for acid pickled wire — about 1.3 pounds per ton.

* * *

Die wear is higher in most instances. On the average this runs 10 to 20 percent, but in some cases even higher than the latter figure. Some die wear may be occasioned by the use of improper lubricants and it should be stated that there are lubricants now available that are especially designed for use on mechanically descaled rod and wire.

* * *

In the October, 1960, issue of WIRE AND WIRE PRODUCTS will be found a paper directly comparing the two processes in considerable detail.

Coating Compounds

QUESTION

What is the function of coating compounds and where should they be used?

ANSWER

Coating compounds, in the generally accepted use of the term, are a uniformly well-balanced and completely homogeneous blend of several ingredients, usually powdered in form and soluble in hot or cold water, that can be applied to coils of wire by spraying or dipping.

The functions of a good compound are:

1) To act itself as a lubricant and as a base-carrying agent for whatever other lubricant, wet or dry, that may be applied for subsequent drawing.
2) To replace sull-coating.
3) To serve as a rust inhibitor during storage.
4) To neutralize residual acid from pickling operations.
5) To act as a cleansing agent for the removal of surface oils, soils, etc.
6) In many cases, to eliminate the need for lime coating.
7) For stainless steel wire, to supplant the lead coating often used.

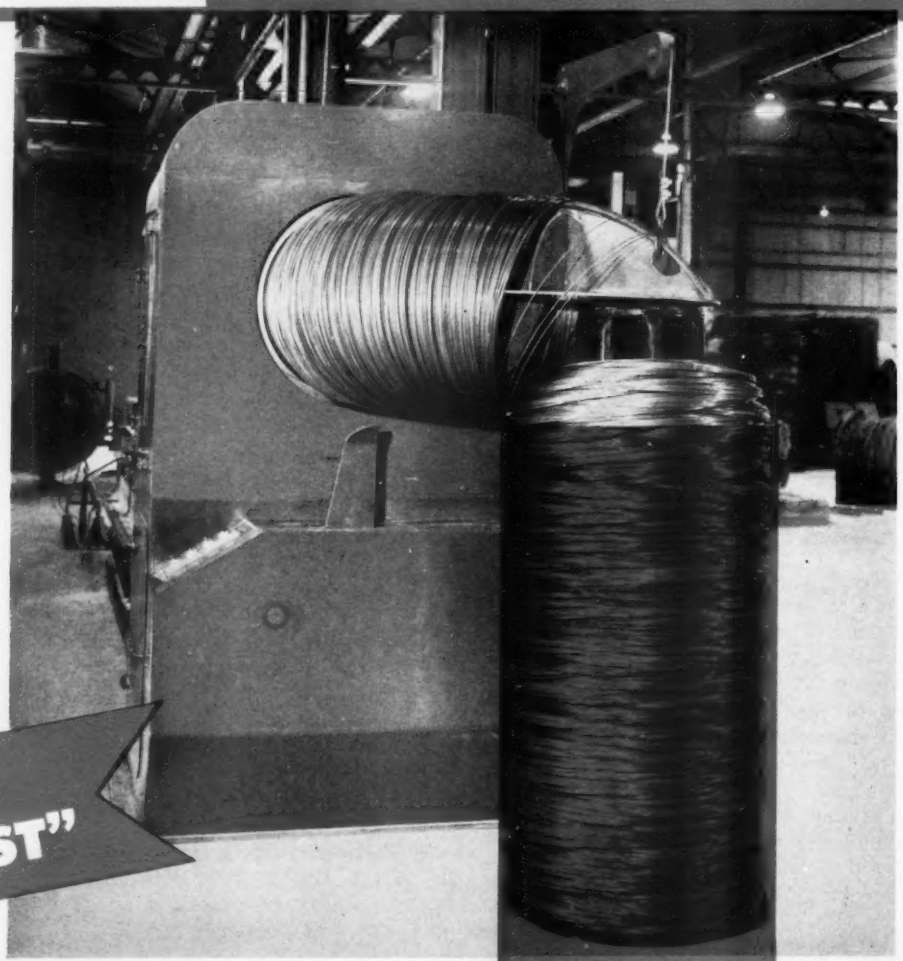
* * *

One might ask how it is possible, if the material is soluble in water, that such a compound can be employed where liming is done or wet drawing lubricants are used. A parallel might be drawn in the case of water soluble paints. Once dried they become insoluble, or practically so. A compound must be thoroughly dried before drawing or wire breakage may result.

* * *

Coating compounds contribute to speed of drawing and better wire finishes; they facilitate cold heading where this use of the wire is planned, provide a better flow of metal in the case of welding wire, give a finish to spring wire that will not slip on knotting, and produce a wire surface that can be enameled, tinned or galvanized without cleaning.

LIVEN Production Output With Whitacre DEAD BLOCKS



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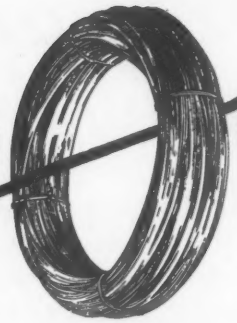


Wire Table Shortcuts

Frequently, in design work, it is useful to have a handy method of calculating approximate diameters, weights or resistances of various gages of solid copper wire.

* * *

The American Wire Gage, used almost universally in the United States today, is based upon a simple mathematical law and the differences between successive diameters are regular.

* * *

The ratio of any A.W.G. diameter to the diameter of the next larger gage number is 1.123; the square of this ratio is 1.261; the sixth power of the ratio (the ratio of any diameter to the diameter of the sixth greater gage number) is 2.005. The fact that this is nearly 2 is the basis of numerous useful shortcuts.

* * *

There are a number of approximate relationships which make it possible practically to reproduce the wire table by remembering only a few simple formulas and data.

* * *

The resistance, mass, and cross section vary with the square of the diameter; thus by the use of the square of the ratio of one diameter to the next (1.261) it is possible to deduce the resistance, mass, or cross section of any size from the next. Since the cube of this number is nearly 2, it follows that for every three gage numbers the resistance and mass per unit length and also the cross section are doubled or halved.

* * *

The approximate factors for finding values for the next three sizes after any given size are 1.25, 1.6 and 2. Furthermore, every 10 gage numbers, the resistance and mass per unit length and the cross section are approximately multiplied or divided by 10.

* * *

It is, of course, necessary to remember the data for some one gage; for example, No. 10 copper wire has **approximately** a resistance of 1 ohm per 1000 feet, a diameter of .100 inch, and a cross section of 10,000 circular mils. The mass for No. 10 is 31.4 pounds per 1000 feet. (It may be easier to remember mass for some other gage, such as No. 5 at 100 pounds per 1000 feet.).

* * *

Another shortcut relates the weight in pounds to the gage; the **approximate** weight in pounds per 1000 feet for any gage of copper wire is equal to the diameter in mils of a wire size **double** the gage number of the original size. (For example No. 8 A.W.G. doubled is No. 16 A.W.G. for which the diameter is 50.8 mils; actual weight of No. 8 A.W.G. is 50 pounds per 1000 feet).

—Courtesy of Autolite Engineering Letter published by The Electric Autolite Co. It is a condensation of the NBS's Copper Wire Tables in Circular 31.

Glycerine Use in Testing Electric Wire

A new application for glycerine in the communications field has been developed by **Western Electric Company** of New York for testing the electrical conductivity of insulated wire conductors.

* * *

By dipping the inner end of a reel of exchange area cable into a conductive solution which contains glycerine and does not evaporate, testing apparatus can be conveniently confined to the outer end of the cable. This procedure is one step in a simplified method of testing the electrical conductivity of each pair of insulated wire conductors within the cable — some types of exchange area cable contain over 2000 paired conductors, or over 4000 individual wires.

* * *

When the inner end of the cable is dipped into the glycerine solution, a temporary "bridge" is established between conductor leads at that end, thereby permitting a continuous electrical circuit to be established for each pair of wires selected for test from the outside end of the cable.

* * *

Exchange area cable, only one of several types of cable manufactured by Western Electric, is used to interlink telephone central offices within a local area and to connect a particular telephone central office with its subscribers.

Sodium Hydride Descaling

QUESTION

Can you tell me something about the sodium hydride descaling process?

ANSWER

In the processing of metals to form billets and to roll rods, the elevated temperatures from hot working produce a scale from the reaction of oxygen with the metal or metals in the alloys.

* * *

The process of descaling is one in which sodium hydride is formed by combining sodium with hydrogen in a fused caustic soda carrier bath, which reduces the oxide scale chemically. This bath completely

(*Please turn to page* 1717)

THE ELECTRIC WIRE & CABLE SECTION
of
THE WIRE ASSOCIATION

The committee, appointed by the Association's Board of Directors, the Electric Wire and Cable Management Committee, extends to all persons interested in and concerned with the production of insulated wire and cable a cordial invitation to join with them in promoting the progress of this branch of the wire industry. This Management Committee presently is comprised of:

CHAIRMAN

Clement C. Lawson, Plant Facilities Eng.
Bell Telephone Laboratories, Inc.
Murray Hill, N. J.

MEMBERS

Harold W. Adams, Director
Electrical Conductor Products
Reynolds Metals Co.
6601 West Broad St.
Richmond, Va.

David Barr, Plant Eng.
National Electric Div.
H. K. Porter Co.
338 14th Street
Ambridge, Pa.

Grover W. Brown, Mgr.
Machinery Devel.
The Okonite Co.
Passaic, N. J.

Charles M. Fredrickson, Technical Dir.
Southern Electrical Corp.
P. O. Box 989, Chattanooga, Tenn.

Alfred Garshick, Devel. Eng.
Boston Insulated Wire Co.
65 Bay St., Boston 25, Mass.

J. K. Gillett, Pres.
Industrial Equipment Co.
Box 706, Englewood, N. J.

Duncan M. Gillies, Pres.
Duncan M. Gillies Co.
66 Central St.
West Boyleston, Mass.

James S. Higgins, Plant Eng.
Copper Div.
Walker Brothers
Conshohocken, Pa.

R. W. Higginbottom, Chief Cable Eng.
Triangle Conduit & Cable Co.
P. O. Box 711
New Brunswick, N. J.

Alexander A. Kerr, Supt., Prodn.
Electrical Wire Div.
John A. Roebling's Sons Corp.
Trenton 2, N. J.

C. L. Kessler, Chief Works Met.
Aluminum Company of America
P. O. Box 150, Massena, N. Y.

Urbain J. H. Malo, Technical Dir.
Narragansett Wire Co.
1102 Main St.
Pawtucket, R. I.

Glen J. Moher, Process Eng.
Canadian General Electric Co. Ltd.
107 Park St., Peterboro, Canada

W. R. Moyers, Chief Eng.
Wire Engineering Dept.
Western Electric Co.
P. O. Station B
Buffalo 7, N. Y.

J. C. Murray, Jr., Vice-President
Crescent Insulated Wire & Cable Co.
319 N. Olden Ave.
Trenton 5, N. J.

Sidney Rolle, Cons. Met. Eng.
32 Snowden Lane
Princeton, N. J.

David M. Schmid, President
Techalloy Co., Inc.
Rahns, Pa.

Benoit J. Sirois, Met. Eng.
Phelps Dodge Copper Products Co.
Bayway & Front Sts.
Elizabeth, N. J.

H. S. Spaulding, Technical Supt.
Kaiser Aluminum & Chemical Corp.
P. O. Box 671, Newark, Ohio

Roger T. Stafford, Project Engineer
Kennecott Wire & Cable Co.
Phillipsdale (Rumford 16), R. I.

Michael M. Suba
Product Sales Mgr.-Polyolefins
Union Carbide Plastics Co.
270 Park Ave., New York 17, N. Y.

J. E. Thomas, Mgr., Brockville Div.
Phillips Electrical Co., Ltd.
Brockville, Ont., Canada

Dr. Robert C. Williams
Vice-Pres.-Research
The Ironsides Co.
270 W. Mound St., Columbus 15, Ohio

Marshall V. Yokelson, Chf. Met.
General Cable Corp.
Bayonne, N. J.

The committee arranges for papers for regional meetings and the Annual Convention, reviews them to see that they are desirable as to subject matter and quality, and formulates policies that will promote the best interests of insulated wire production personnel. Recent authorization to increase the membership to twenty-five will be implemented by further appointments in the near future.

You are invited to send for a booklet describing the activities of The Wire Association and a membership application card.

THE WIRE ASSOCIATION

RICHARD E. BROWN, EXECUTIVE SECRETARY

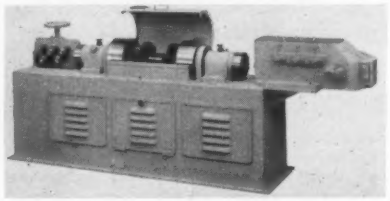
453 Main St. **Stamford, Conn.**

New Mechanical Rod Descaler

Straus-Artys Corp. has announced a new Salvi Mechanical Rod Descaler arranged with double planetary gear specifically designed for the processing of stainless steel, alloy, and high carbon rods.

* * *

Heretofore, mechanical descalers were only successful if used in connection with mild steel rod, but with the introduction of this new



unit, mechanical rod descaling can now be extended with excellent results to stainless steel, high carbon and alloy steel rod.

* * *

Not only is the scale broken and brushed clean by its double planetary gear brush system, but the machine is so designed that it can be used to get the first draw with the water cooled drawing die holder built into the forced lubrication box. The machine completely does away with the sometimes difficult problem of acid waste disposal.

* * *

For further information write to Straus-Artys Corp., 45 No. Station Plaza, Great Neck, N.Y.

Insulating Oil Dielectric Tester

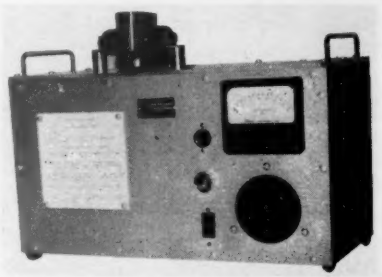
A new light, portable unit for on-the-spot dielectric testing of transformer oil, pyranol and other insulating liquids, has been developed.

* * *

Meeting requirements of ASTM and Mil Specs, portable test set Peschel Model K35-2-OC features a continuously variable output of 0 to 35KV rms at 2KVA capacity; will operate from ordinary lighting circuit of 110 volts, 60 cycles; metering directly at oil cup for greatest accuracy; easily removable oil cup; simplified control circuitry for easy operation; fast, trip-free, manual reset circuit breaker de-energizes the HV when sample breaks down; 4½" square KV meter with linear scale; three conductor input cord with safety grounding plug.

* * *

The oil cup conforms to ASTM D149-59T, has one inch diameter flat electrodes spaced 1/10 of an inch apart, and is provided with a gauge to reset the adjustable gap



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for BETTER printing on
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and other EXTRUDED materials

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66 CENTRAL STREET,
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EFFICIENT, MODERN SYSTEMS FOR ELECTRICAL WIRE & CABLE MANUFACTURING

• ***CABLE LACQUERING SYSTEMS***

Conventional cellulosic, or other type, lacquers are applied in successive continuous coats from one to twenty-eight coats over fibrous braid wrapped primary conductors. One end, four ends, or eight ends of wire are handled continuously. System includes letoff, application, drying and constant tension takeup equipment.

• ***WIRE ENAMELING SYSTEMS***

Natural and synthetic enamels, silicones, solution nylon, modified plastisol, and similar insulating coatings are applied to bare, cotton or glass covered wire in round, square or rectangular cross section. Ten or twenty simultaneous strands are handled. Systems are complete with letoff, preannealer, application system, capstan and multiple takeup unit.

• ***ASBESTOS INSULATING SYSTEMS***

Carded asbestos is applied to continuous single conductor as an integrated operation with saturating, rotary forming, drying, cooling and polishing of the finished wire. Wire from No. 20 gauge to No. 6 AWG is handled through an asbestos wall thickness range of from .008″ to .040″ thickness in a single pass.

• ***RUBBER OR PLASTIC JACKETING SYSTEMS***

Rubber and thermoplastic jacketing compounds are continuously applied to electrical wire or cable by the extrusion method. High speed, constant tension letoff and takeup equipment, controlled cooling or continuous vulcanizing equipment are powered by synchronized range drives as complete, integrated wire handling systems. Extrusion machines of customer's choice are furnished.

• ***GLASS & VARNISH COATING SYSTEMS***

Double layer of glass or cotton wrapping is applied to round, flat or square conductor. Two individual coatings of high temperature varnish are applied and the finish baked in a continuous operation. Units are complete from letoffs to takeup frames.

• ***SELF TRAVERSING REEL CORD DRYERS***

These ingenious machines are used to remove hygroscopic moisture from fibers, braided or knitted flexible cable. These machines increase extrusion speeds, reduce blister scrap loss and improve diameter control. They are easily installed in existing extrusion line.

TECHNICAL INFORMATION ON ANY OF THESE PROCESSES UPON REQUEST

C. A. LITZLER CO., INC.

235-239 BROOKPARK ROAD

CLEVELAND 9, OHIO

when necessary.

* * *

Optional motorized output control available to increase test voltage at 3KV per second as recommended by ASTM specs.

* * *

Cabinet measures 21″w x 9″d x 12″ high exclusive of demountable oil cup, which is 4″ high. Weight is approximately 70 pounds. Model K35-2-OC is priced at $625.00 and is available on short delivery time. Additional literature available from **Peschel Electronics, Inc.**, Towners, Patterson, N. Y.

ABSTRACTS

These abstracts are published through the courtesy and with the permission of the Industrial Diamond Information Bureau, 2 Charterhouse Street, London, E.C.1, England. Inquiries regarding them should be directed to the Bureau.

Important points on the use and maintenance of diamond wire drawing dies

British Diamond Wire Die Co., Parkstone, Dorset. *Indian Wire Industr J* 1960 Vol 3 (5) p 70 (May)

Not only is better quality production obtained by using and maintaining diamond dies correctly, but maintenance costs are thereby considerably reduced. Dies should be removed for inspection regularly and an examination made to determine whether the polish is sufficient or whether the reduction zone, bearing, or exit is damaged. The reconditioning of dies at various stages of wear is described briefly.

Electronic valve and tube manufacture

Mullard Ltd, Blackburn. *Metallurgia* 1960 Vol 61 (366) pp 153-156 (Apr)

In the manufacture of tungsten and molybdenum wires, tungsten rods are drawn through a series of progressively smaller dies until they have been reduced to the thickness required. Hard metal dies are used in the initial stages, but as the wires become thinner, diamond dies are necessary. 7 illustr.

The fundamentals of wire drawing

C. P. Bernhoeft. *Wire Ind* 1960 Vol 27 (319) pp 693, 695-699, 701 (July)

The rules given here, although based on the drawing of aluminum wire, can, under certain conditions, be applied to the drawing of all other metals. 11 tables. (To be cont).

A preview of some exhibits at the International Machine Tool Exhibition, Olympia, London, June 25 to July 8

Anon. *Wire Ind* 1960 Vol 27 (318) pp 585-589, 591-592 (June)

Exhibits of interest to the wire industry are described, including L. M. Van Moppes diamond products. 11 illustr.

'TURBO' Centrifugal Coolant Cleaners

Anon. *Indian Wire Industr J* 1960 Vol 3 (6) pp 79-80 (June)

Scientists' notebook — Wire temperature measuring device

Anon. *Financial Times* 1960 (22151) p 11 (Aug 3)

A new and more accurate device for measuring wire temperature during drawing is said to enable markedly higher drawing speeds to be achieved than have hitherto been possible. At the same time, the new temperature measuring device enables maximum drawing speeds for various steel qualities to be very quickly established, together with different drafting schedules. It is claimed that, as a result, it can be used to form the basic unit of a future system of automation and process control in wire drawing mills.

A wire temperature meter

Addison Electric Co Ltd, 10-12 Bosworth Rd, London W 10. *European Tech Dig* 1960 Vol 5 (8) p 40 (Aug)

In co-operation with BISRA, the manufacturer has developed a meter for measuring the temperatures of moving wires in the control of wire drawing and similar processes.

When to use carbide dies

A. E. Chambers, W. K. Facknitz. *Machinery, NY* 1960 Vol 66 (7) pp 115-120 (Mar)

Among topics discussed is the belief that the maintenance time required for carbide dies is greater than that for steel. This is only partially true. While less material is removed per pass of the diamond wheel in grinding carbide, less stock removal is required in resharpening. The cleaning procedures following the grinding of carbide dies should be duplicated on steel dies. When this is not done, the effects are not as harmful with steel dies as they are with carbide dies. Diamond, the material used to sharpen carbide dies, must be completely removed from the die before it is used. Diamond particles in the grinding wheel tend to embed themselves in the steel parts of the die, not in the carbide, and if these steel portions come in contact with the carbide, the carbide will become abraded or worn away quite rapidly. 5 illustr.

Friction and lubrication in engineering production — wire, tube and bar drawing

J. S. Hawkins, *Prod Engr* 1960 Vol 39 (4) pp 226-234 (Apr)

Problems of wire drawing are discussed, both in hot drawing and cold drawing. Die wear is the most important factor. Diamond dies are only used for very fine wire. Different processes and details of production such as reduction of drawing force, heating of the die, bonderizing and lubricants are examined. 11 illustr, 13 ref, 3 tables.

Importance of die measuring and inspecting instruments

Anon. *Indian Wire Industr* 1960 Vol 3 (3) pp 32-33, 40 (Mar)
5 illustr.

Copper wires

Anon. *Indian Wire Industr* 1960 Vol 3 (3) pp 34-35, 39 (Mar)

For drawing wires above 1 mm diameter tungsten carbide dies are used but for the finer sizes diamond dies are always preferred.

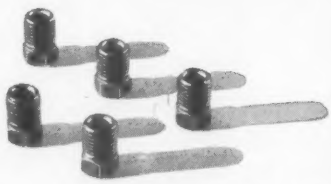
New Laboratory For Apex Alkali

New, improved service facilities have been added by **Apex Alkali Products Co.**, Philadelphia, for Research and Development . . . laboratory facilities have been doubled in order to accommodate new equipment for controls and testing of manufactured and new product developments for The Wire Industry.

PLANETARY THREAD ROLLING MACHINE CUTS COSTS

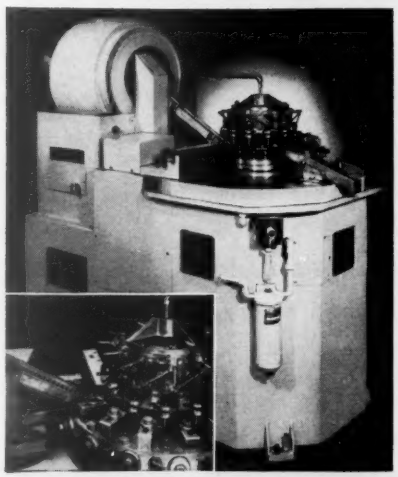
Rolls External Threads on HOLLOW WORK Class 3 Fit

9,000 TO 20,000 PIECES PER HOUR



IF YOU ARE NOW BUYING tube nuts like these, you can cut costs by heading them yourself and roll-threading the hollow parts on a Prutton Model 300. You can buy cheaper stock (rolled wire) and make your own parts.

IF YOU ARE NOW MAKING THESE PARTS ON A SCREW MACHINE, you can get "cold forged" quality faster for less than the cost of cutting or grinding. No need to buy expensive hex-stock. And, you eliminate these screw machine operations: drilling, turning, chamfering, threading, and cut-off.



PRUTTON'S PLANETARY CIRCULAR DIE accounts for the tremendous increased production. Hollow parts are hopper fed in a continuous stream to the circular die. The "lost motion" of the reciprocal type thread roller is completely eliminated.

The Prutton Model 300 is the only *high speed* machine on the market for external roll-threading of hollow work. It can roll-thread as many as 18,000 pieces per hour with a slow die speed of only 164 fpm — which means long die life. Speeds output many times — cuts costs 50% — improves quality — saves man hours and floor space. Used by some of the biggest names in American industry.

VERSATILE: Built primarily for hollow work . . . but may also be used on solid work in a wide range of metals and sizes.

HIGHER OUTPUT AND LOWER COSTS ADD DOLLARS TO YOUR THREAD ROLLING PROFITS . . .

A Prutton can be used for thread rolling, roll forming, knurling, marking, serrating and necking of threaded hollow work, special parts, nails, bolts and screws in a wide range of sizes. Send prints and/or samples for free estimates on machine costs.

Write or Phone for Cost Saving Information TODAY!

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5295 WEST 130th STREET
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Leader in Planetary Thread Rolling

JUST PIN THIS COUPON TO YOUR LETTERHEAD

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Please send information on Model 300 Thread Rolling Machine.

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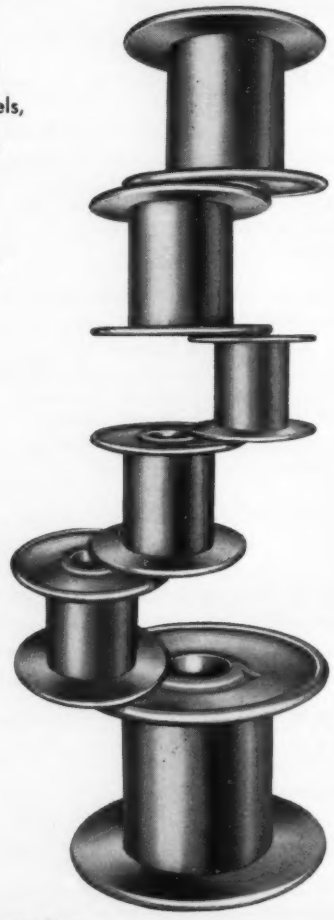
APCO Steel Reels *Engineered For* Balance!

Smooth, High-Speed Wire Processing begins with precision-balanced Apco reels, spools and bobbins. Engineered to exact tolerances, Apco steel reels run steady and true on the arbor . . . last longer because they're made stronger . . . won't gouge, warp or burr ever. All-steel reel construction by Apco is extra safe, extra durable for repeated handling . . . assures easy spooling without wire breakage or trapping. It gives you a low-cost production package that pays off in wire savings, minimum machine downtime, and many more on-the-line economies.
Tell us your wire or wire handling problem. You can be sure that Apco has the answer that makes real sense.
Prompt delivery, too.
Write, wire or phone collect.



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47 Colbourne Street, West
Toronto, Ontario, Canada

APCO MOSSBERG COMPANY
LAMB STREET, ATTLEBORO, MASSACHUSETTS

New S&C Machine for Rod

The Lewis Machine Company has completed and delivered to one of the world's leading steelmakers, a new high speed straightening and cutting machine to handle up to 1" rod from the coils.

* * *

This new model No. 12-FA is the largest and most powerful machine of this type, designed and built especially to handle 1" diameter rod. Lewis engineers chalked up more than 3,000 hours at the drawing board and in basic research work on this new machine.

Model 12-F-A

They emphasize that the No. 12-FA is completely new and was designed and built, from the ground up, for the special requirement of straightening and cutting large diameter rod from coils.

* * *

The machine is powered by a HP Wound Rotor Motor and a 15 HP Variable Speed Motor. The first machine, which is 85 ft. long, has a 60 ft. cut-off and weighs over 46,000 pounds.

* * *

Advanced design features have been incorporated in the new No. 12-FA, such as crank action; high-speed flying shear type cut-off; two-speed rotary straightener arbor with dual-center straightening dies for faster, more accurate straightening over a wide range; dual-range pushbutton operated Pneumatic feed pressure for exact feed control and coil end pull-through, without twisting; air clutch and air brake actuated by extremely sensitive electric trip with accurate length gauging mechanism; and positive sliding gear type transmission with eight feed speeds of 115 to 350 ft. per minute in any rod diameter from ½" to 1".

* * *

The No. 12-FA is designed to handle either cold drawn or hot

rolled rod. For hot rolled rod an exhaust hood and blower is available to draw off the loose scale.

* * *

The Lewis Machine Company, 3441 East 76th St., Cleveland 27, Ohio, is a Division of Curtis Manufacturing Company.

Wire & Textile Machinery Moves Into Larger Plant

The Wire & Textile Machinery, Inc., for the last twenty years located at 80 Fountain St., Pawtucket, R. I., has moved approximately two blocks away from this location to 331 Roosevelt Ave., Pawtucket. The new building has 50,000 square feet of space for offices and plant.

* * *

The new location, with double the floor space and much new machine shop equipment, now will be able to keep pace with the growing demand for new and used equipment for the wire and textile industries.

* * *

The firm's expansion, first to the West Coast and now to its new location, also contemplates a European branch for the handling of used wire and cable equipment, cordage equipment, and braiding equipment.

* * *

The company has been established for twenty-seven years, handling used wire and cable equipment and are the largest dealers of this type of equipment in the world.

International Cable Day In Hannover

The Krupp engineering section **Fried. Krupp Maschinen- und Stahlbau,** of Rheinhausen, arranged at the Krupp Pavilion at Hannover Fair 1960 for the first time in its existence a "Cable Day". About 100 leading personalities of the foreign and German cable manufacturing industry had been invited to this all-day event. In the morning, an engineer from Pirelli S.p.A., Milan (Italy), showed the film "Laying of a 220-kW Cable in Vertical Shaft". Subsequently, Prof. Dr.-Ing. **K. Brinkmann** and **Dr.-Ing. M. Beyer** (Ger-

For Moisture Resistance, Specify

TEXTILENE

TWI-FLEX and **TWI-WAX**

Treated to reduce wicking and prevent leaching, lightly waxed Textilene Twi-Flex and heavily waxed Textilene Twi-Wax provide effective resistance to moisture. Both fillers are extensively employed for non-metallic sheathed cable (building wire), maritime shipboard cable, varnished cambric cable, and underground service entrance cable.

Twitchell's superior Textilene line also includes: Soft, dry fillers — *Twi-Port* and *Glascor** (Fiberglas-centered for high tensile strength without added bulk). Used for control, power, appliance, coaxial and communications cables, and all portable and flexible cords. Fungus-resistant filler — *Twi-Tar*. Used for buried communications cable, expanded ACSR cable, and in other applications.

*Patent Applied For

For Every Wire and Cable Application
Twitchell's TEXTILENE Fillers Fill The Bill

Quality-controlled materials that are dependably uniform . . . in standard forms, or customized to special needs.

Initial low cost with savings added by production efficiency . . . flexible, ready-to-use fillers that fit all equipment, handle and form easily, always maintain desired shape.

Assured supply from a reliable domestic source . . . always available in economical and convenient packaging.

Proved performance as components of cables and wires that meet government specifications . . . stability shown by trouble-free installations in continuous service 20 years and longer.

FREE — SAMPLE SPOOLS of any type of Textilene filler to demonstrate the superiority of Twitchell materials in your operation—also technical counsel without cost or obligation. Just tell Twitchell your end-use requirements. *Write, wire, or phone today:*

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Third and Somerset Streets, Philadelphia 33, Pa. • REgent 9-7800

PAPER PRODUCTS FOR THE WIRE INDUSTRY

Twisted • Folded • Pressed • Crushed • Shaped • Braided • Woven

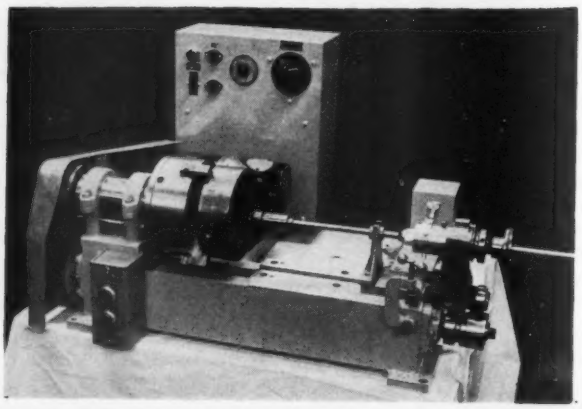
LOOK!

what they're doing in the

DIE ROOM NOW!

NEW DYKREX

DIE SERVICING & FINISHING MACHINE
FOR REFINISHING LARGE DIES
UP TO 7½ INCH CASINGS



DYKREX Engineers

have done it again! Instead of using a Special Large Lathe, Internal Grinder and then Hand finishing LARGE Dies; NOW your Dies up to 7½" in diameter can be finished in your own Die Room with this New Dykrex Die servicing machine.

DYKREX wire die finishing machines
The Standard of the Wire Industry

DYKREX CORP. OF AMERICA

Manufacturers & Engineers

17-19 Grove Street ● **Montclair, N. J.**
(Newark Suburb)

many) addressed the audience on "Improvement of Paper-Oil Dielectric by High-Vacuum Drying and De-Gasification". In the afternoon, the guests listened to papers of Dipl.-Ing. **R. Nordell** (Sweden) on "Development of Plastic-Coated Cables in Sweden" and of **E. Fischer** (Switzerland) on "Testing and Automatic Control in Plastic Plants". This paper was followed by an interesting discussion and by contributions of Mr. Müller, Director of Kabelwerke Brugg (Switzerland) and Mr. Le Davay of Geoffrey Delore (France) on plastic-coated cable problems in their countries and, in conclusion, Mr. Fischer (Switzerland) spoke on his equipment developed for measuring of excentricity of plastic-insulated conductors. All engineers present from the cable industry took a marked interest in cabling and stranding machinery shown by the Rheinhausen Krupp-Works at the Krupp Pavilion. The company expects that the Cable Day will be repeated at the fair in Hannover next spring.

Remote Reading Load Cell System

An unusual new remote indicating load cell system permits instantaneous, direct readings of forces, in pounds, at distances over 1000 feet from the actual cell. Applications are found wherever site proximity is inconvenient, dangerous, confined or outside of naked eye range, such as a scale dial located on a crane high off the floor or a setup on a rocket test stand, etc. However, practically all

industries will find this remote reading load cell system useful.

* * *

Dillon load cell systems cost approximately 50% less than conventional strain gauge types and take up only about 1/5th the area. As an example, the 0-4000# model load cell sells for $340. The readout indicator price is $495. Indicator weighs only 9 pounds and is approximately 10" x 10" x 6" in size. Prices include standard equipment including cable, sockets, batteries and recorder jack.

* * *

For 12-page illustrated brochure and complete prices, write: **W. C. Dillon & Co., Inc.,** 14620 Keswick St., Van Nuys, Calif., attention of George A. Dillon.

Calibrating Unit For Corona Test Sets

To conform to Mil C17-C in connection with the testing of coaxial cables, it is necessary to possess a means of periodically checking a Corona Test Set to make certain that its sensitivity is 5 micro-micro coulombs per inch scope deflection.

* * *

Peschel Model CT-CAL-1 calibrating unit for Corona Test Sets is available for this purpose. It features a direct-reading dial calibrated in micro-micro coulombs, and simplifies greatly this required sensitivity measurement.

* * *

The calibrating unit is composed of a pulse generator with a continuously adjustable and regulated output, and includes a corona-free calibrating capacitor rated at 25 KV rms. The output control has a linear scale, and is calibrated directly in micro-micro coulombs.

* * *

The pulse generators output is 10-20 microseconds wide with a rise time of 0.5 microsecond and a repetition rate of 60 cycles per second. The amplitude control is continuously adjustable from zero to 100 millivolts. The calibrating capacitor is 100 mmfd. ± 5%.

* * *

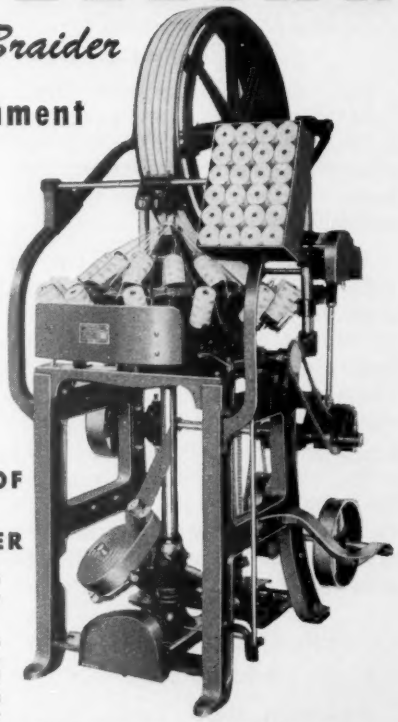
Full details may be secured from Peschel Electronics, Inc., Towners, Patterson, N. Y.

WARDWELLIAN

24 Carrier Cable Braider

With Taping Attachment

Applies Tape and Braid to Conductor Simultaneously



HAS ALL THE FEATURES OF WARDWELL STANDARD 24 CARRIER CABLE BRAIDER

- Taping head has means for adjusting the tension applied to the tape, thereby assuring a uniform lay.

  A mechanical stop motion which operates upon breakage or exhaustion of the supply, stops both the taping head and braider head at the same time. This eliminates the possibility of braiding over the conductor when the tape is not being applied.

  Change gears for altering the lay of the tape are conveniently located at front of the machine.

  Due to the space required for the taping attachment, this machine can be furnished with high stand only.
- Production 54" to 259" per minute depending upon the texture of the product.
- Standard set of twelve change gears furnished with each machine.
- Machine can be adapted to produce one-and-one braid by changing thread deflectors.
- Carrier speed 75 R.P.M. for cables from ¾" diameter to maximum of 1⅛" diameter or 500,000 circular mils; production 900 picks or plaits per minute.
- Carrier speed 100 R.P.M. for cables ¾" diameter and smaller, 1,200 picks or plaits per minute.
- Equipped with "Maxitorq" clutch; 12" driving pulley, 3" driving belt.
- Speed of braider countershaft 345 R.P.M. for carrier speed of 75 R.P.M. or 460 R.P.M. for carrier speed of 100 R.P.M.
- Ratio of braider countershaft speed to carrier speed 4.6 to 1.
- Capstan 36" diameter, 6" face.
- Beater opening 1¾" diameter.
- Supply yarn packages Universal wound, 2-11/16" diameter, 5" traverse on tubes 5¼" long, ⅝" hole, four point wind.
- Counter for measuring product in feet or yards furnished upon request at additional cost.
- Motor drive furnished upon request at additional cost.
- Power required dependent upon conditions. Estimate furnished upon request.
- Supply and windup stands are not furnished.
- Weight approximately 1850 lbs.
- Weight crated for domestic shipment approximately 2000 lbs.
- Weight boxed for export shipment approximately 2500 lbs. or 1134 kilograms.

TAPING ATTACHMENT DATA:

- Maximum number of turns of taping head 100 R.P.M. — minimum 16 R.P.M.
- Maximum diameter of supply package 12".
- Maximum width of tape 3".
- Minimum width of tape ¾".
- Size of hole in tape package 3".
- Taping head is equipped to run either clockwise or counter-clockwise.

REPRESENTATIVES FOR EUROPE, BRITISH COLONIES AND DEPENDENCIES
JAMES MACKIE & SONS, LTD.
BELFAST, IRELAND

Wardwell
BRAIDING MACHINE CO.
CENTRAL FALLS, RHODE ISLAND, U.S.A.

133-9

Outstanding Personalities of the Wire Industry

Two Men Appointed to Sell Silicones

The Silicone Products Dept., General Electric Co., Waterford, N. Y., has announced the appointment of **James S. J. Berray** and **Robert L. Daileader** as sales representatives.

* * *

Mr. Berray will work out of 1285 Boston Ave., Bridgeport, Conn. He is a Chemical Engineering graduate of Brooklyn Polytechnic Institute and holds an MS in Chemical Engineering from Northwestern University.

* * *

Mr. Daileader will have his office at 5050 State Rd., Drexel Hill, Pa. He graduated from the University of Michigan with a B.S. degree in Chemical Engineering.

Wisconsin Wire Works Adds to Staff

Wisconsin Wire Works, Appleton, Wisconsin, has announced the appointment of **Wesley G. Price** of Ashburnham, Mass., as sales representative for the New England territory.

* * *

Since his graduation from Boston University in 1951, Mr. Price has been associated with the Gulf Oil's Industrial Products Division in New England and also with the Orton Corp., as Northeastern representative on Brandon Dryer Felts.

Wesley G. Price

* * *

"Wes" Price is well known throughout the area. He is active in the paper industry and is also a member of PIMA. Mr. Price has recently completed an indoctrination course at the Wisconsin Wire Works plant and is assuming his new duties and responsibilities immediately.

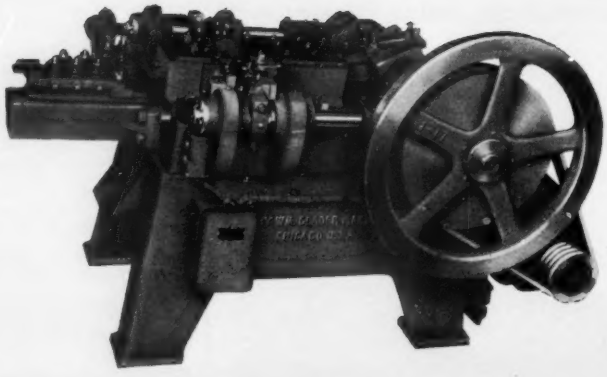
R. H. Miller Appoints Charles Turk

R. H. Miller Company, Inc., Homer, N. Y., has announced the appointment of **Charles Turk** to its sales staff, effective October 1st. Well known to the wire and steel industries, Mr. Turk will service the metal-working field with "Steelskin," "Copperskin" and

GLADER NAIL MACHINE

a NAME and MACHINE
that have stood for
DEPENDABILITY since 1887

our Nail Machine
"KNOW-HOW"
means $$$ for you



Wm. GLADER MACHINE WORKS 210 N. RACINE AVENUE CHICAGO 7, ILLINOIS

EXPORT DEPT. 122 EAST 42ND STREET • NEW YORK 17, N. Y.

"Redskin" Lubricants in Miller's southern territory.

* * *

Formerly plant manager and vice president of operations with **Seneca Wire and Manufacturing Co.**, Fostoria, Ohio, Mr. Turk has been associated with the wire industry since 1921 when he joined **American Steel & Wire** at the Waukegan plant. He later became plant manager at Chicago for **Interstate Iron** and Steel Co., which merged with Republic Steel.

* * *

Mr. Turk resides at 2958 Crestline Drive, Macon, Georgia.

Waterbury Farrel Appoints Engineering Head

John E. Eckert has been appointed Vice President in charge of Engineering by **The Waterbury Farrel Foundry & Machine Co.**, Division of Textron Inc., according to an announcement made by **A. D. Mitchell**, President of the Division, manufacturers of metalworking machinery in Waterbury, Conn., with plants there and in Cheshire, Conn.

* * *

Mr. Eckert holds a degree in Mechanical Engineering from Clarkson College of Technology in Potsdam, N. Y. He has had engineering experience with American Rolling Mill Company from 1937 to 1942

John E. Eckert

and with the Armzen Company in connection with the engineering of Sendzimir mills during the period 1942 to 1956 in which year the staff of Armzen Company was merged with Waterbury Farrel. At that time, Mr. Eckert became the Chief Engineer of the consolidated Rolling Mill Division.

* * *

At the same time, Mr. Mitchell also announced the appointment of **Andrew J. Beck** as Chief Engineer of the Rolling Mill Division and of **Lawrence J. Litalien** as Purchasing Agent.

Blane Appoints Sales Representative

Martin M. Steckert has been appointed New York Area Sales Representative for **The Blane Corporation**, Canton, Mass., manufacturer of vinyl and polyethylene insulation compounds and color concentrates, according to an announcement by **Gerry Kerstein**, Vice President and Sales Manager.

* * *

Mr. Stekert brings 30 years' experience in metals, plastics, and custom molding sales, to Blane.

Marking Machines, Wheels & Inks

FOR INSULATED WIRE, TUBING AND PIPE—

Type VDM — Illustrated has these Features:

1. Use present towers, no changes necessary.
2. One filling of ink well, gives 18 HOURS of continuous simulated spiral striping, number coding or printing.
3. For single or double marking or hash mark striping.
4. Constant wiper pressure.
5. Diam. range .032 thru 1½".

GEM GRAVURE CO., INC.
West Hanover, Massachusetts, U. S. A.
CABLE ADDRESS: GEMGRA
Telephone: ROCKLAND TRiangle 8-0456

IN THE MARKING OF EXTRUDED MATERIAL THERE ARE BIG ADVANTAGES IN ONE SINGLE SOURCE OF SUPPLY.
KNOW-HOW • INKS • WHEELS • MACHINES

West Coast Representative: Paul I. Kenner Co., 230 Shaw Rd., So. San Francisco, Calif.
West Germany: Walter G. Fritzke GMBH, AM Wehrhahn 94-96, Dusseldorf, W. Germany
Warbrick Engineering Specialties Limited, Barclays Bank Chambers, Sanky Street, Warrington, England.

He has an extensive business background which embraces many phases of distribution, manufacturing, and international trade. He is a graduate of New York University.

U. S. I. Names New Vice President

Paul J. LaMarche has been made Vice President of Production for **U. S. Industrial Chemicals Co.**, Division of National Distillers and Chemical Corp., it was announced by **Robert E. Hulse**, division General Manager and Executive Vice President of the corporation.

* * *

Mr. LaMarche joined U. S. I. in 1949. Shortly thereafter, he became Manager of Sodium Sales. From 1951 to 1958, he was Manager of the company's plants at Ashtabula, Ohio. He became Director of Production in 1958. He graduated in 1940 from the Case Institute of Technology with a B.S. degree in Metallurgical Engineering.

New President of Scott Testers (Southern), Inc.

The appointment of **John E. Hargreaves** as President of **Scott Testers (Southern), Inc.**, with offices in Spartanburg, S. C. has been announced by **David C. Scott, Jr.**, President **Scott Testers, Inc.** of Providence, R. I. Mr. Hargreaves succeeds **James M. Scott**, who died on June 19, 1960. Prior to his appointment, Mr. Hargreaves was manager for Scott Testers (Southern).

* * *

He joined Scott Testers, Inc. in 1952, after having served as laboratory technician for J. & P. Coats, Pawtucket, R. I., and Jones, Gardner & Beal Inc., Providence, R. I. After a period of training program at Providence, Mr. Hargreaves moved to Spartanburg in 1953, first to take charge of service and repair operations, and in 1958 assuming responsibility for sales as well. As President, he will continue to supervise sales and service of Scott testing equipment for the textile, rubber, paper, leather, plastics, and wire industries throughout the Southeastern United States.

* * *

Mr. Hargreaves' education included special studies in textiles at both the Rhode Island School of Design and the Massachusetts Institute of Technology.

CF&I's Buffalo Purchasing Moved to Trenton

The Colorado Fuel and Iron Corporation has announced the transfer of its Buffalo Purchasing Department to Trenton, N. J., according to L. C. Rose, director of purchases for CF&I.

* * *

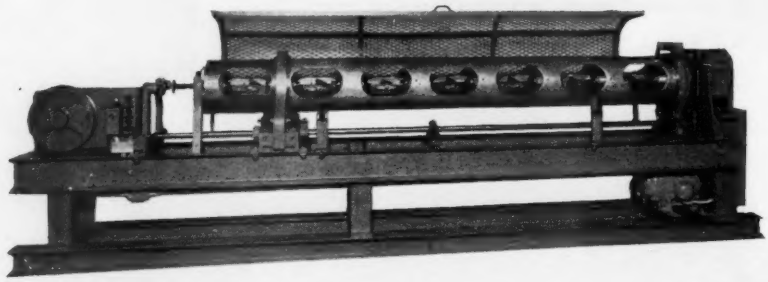
Effective November 1, 1960, purchasing for the offices and plants within the Eastern division, Wickwire and Roebling, was placed under the supervision of **A. R. Kinney**, director of purchases and **K. S. Dickel**, now purchasing agent for the Eastern division, including

SEVEN BAY
HIGH SPEED
STRANDER

MODEL 7 B 55

This precision, perfectly balanced machine features: rigid steel box structure-barrels of high strength ALCOA alloy — motor mounted below center of gravity — safe, positive drive — push button controls— carbide wire guides — interchangeable cradle assemblies — standard cradles taking 7" diam. X 4" Traverse Spools — 30 lengths of lay.

BARTELL FOR THE BEST



• CATERPILLAR CAPSTANS • SINGLE & MULTIPLE HEAD RESPOOLERS • WIRE STRANDERS
• TAKE-UP & PAY-OFF STANDS FOR PLATING EQUIPMENT

BARTELL MACHINE-TOOL CORP.
YACHT CLUB ROAD ROME, N. Y.
• DESIGNERS • MANUFACTURERS • ENGINEERS • CONSULTANTS

WE ALSO DESIGN AND BUILD SPECIAL EQUIPMENT TO MEET SPECIFIED REQUIREMENTS

Roebling. The new headquarters will be located at 640 South Broad St., P.O. Box 321, Trenton, N. J.

Crucible Appoints Research Head

Peter Lillys has been appointed Supervisor of **Crucible Steel Company's** Syracuse Research Laboratory. He succeeds **Dr. A. M. Aksoy** who was transferred to Pittsburgh as Section Manager — High Temperature Alloys and Tool Steels, Technical Development Division.

* * *

Mr. Lillys joined Crucible in 1951 as a staff metallurgist at the Company's Eastern Research Laboratory in Harrison, N. J. He was transferred to the Central Research Laboratory in Pittsburgh in 1955 and in 1958 he was named Associate Metallurgist at the Syracuse Laboratory. He held this position until his present appointment.

* * *

A native of New York City, Mr. Lillys attended Rensselaer Polytechnic Institute where he was graduated in 1951 with a B. S. degree in Metallurgy.

Hunter Spring Appoints Field Engineer

Hunter Spring Company, A Division of American Machine & Metals, Inc., Lansdale, Pa., announces the appointment of **Mark Reeve** as Field Engineer for a territory comprised of Eastern Michigan and Northern Ohio. In this area, Mr. Reeve will provide engineering service for all Hunter products, which include precision springs, metal stampings, the Neg'ator constant-force extension spring and long-running spring motor, the Flex'ator constant-force compression spring, and Spir'ator retriever reels, as well as Hunter's growing line of force measuring and testing equipment.

* * *

Mr. Reeve is a graduate of Princeton University, class of 1952. Prior to coming to Hunter Spring Company he was associated with The Industrial Cable and Sling Company, Wire Rope Corporation of America, and the Electric Range Division of Philco Corporation.

Turk Joins Glen Carbide

A. Earle Glen, President of **Glen Carbide, Inc.**, Pittsburgh, Pa., has announced the appointment of **C. E. Turk** as a representative, with headquarters in Macon, Georgia.

* * *

Mr. Turk has had many years of experience in the manufacture of wire, having served with the **Republic Steel Corporation** and the **Seneca Wire & Manufacturing Company.** He also has had experience in other fields using carbide products, particularly in rolling mill applications.

* * *

This appointment will provide Glen Carbide Customers with improved technical and delivery service in the southern states.

Promoted by Autolite

Replacing **Jack Gerber** as head

Important DIFFERENCES
BETWEEN JUST ANY REEL AND
All Welded MPS
TAKE-OFF REELS
Three important differences that mean longer reel life in both processing and handling of all types of insulated wires in your plant.
1 New MPS deep wide, straight type embossed radial rib adds considerable strength to reel heads over the old style narrow tapered rib.
2 Increased height of the curled edge adds even more strength and rigidity, especially to the rims.
3 Furnished with rib fillers that are projections on the end of the barrels that fit into the embossed radial ribs thereby eliminating any marking of the plastic or rubber insulated wires at the junction of head-barrel.
4 Finally, the all welded "J" type construction of the entire reel completes the picture.
The finest Take-off reel you can buy.
We invite your inquiries — let us tell you more about MPS Take-off Reels. Write us today.
Mossberg PRESSED STEEL Corporation
"Division of Wanskuck Co."
18 West Street — Attleboro
Massachusetts U.S.A.
Telephone: CAstle 2-0847
109

of the Hazleton, Pa., Autolite plant is **Peter DeGraziano**, named assistant manager of manufacturing in charge of operations at Hazelton.

* * *

Mr. DeGraziano, who came to Autolite in 1950, has held various supervisory positions since that time and moves up from the position of Hazleton production manager, a post he has held since 1958. He is a member of the Wire Association.

Firth Sterling Promotes Sowko and Donnelly

Firth Sterling Inc. announces the promotion of **John J. Sowko** to sales manager, product development, carbide division, and **Norman E. Donnelly** to Pittsburgh district manager, carbide division.

* * *

Mr. Sowko joined Firth Sterling eighteen years ago and has served in the carbide division as die engineer, assistant district manager, Chicago, and district manager in Pittsburgh. In his new capacity, Mr. Sowko will be responsible for creating sales for new applications for carbide products, as well as developing new items and new applications.

* * *

Mr. Donnelly started with the company nineteen years ago in the carbide sales division. He has served in various capacities from cost estimating to office manager in Chicago and field sales in Pittsburgh. In his new capacity, he will be responsible for the sale of carbide products in the Pittsburgh area.

Norton Appoints West Coast Plant Superintendent

Irvine F. Williamson has been appointed superintendent of **Norton Company's** Santa Clara, California, plant. He will assume his new duties in January after a period of special training at the main plant in Worcester.

* * *

Mr. Williamson joined Norton in 1954 as an industrial engineer. He was named assistant foreman of the packing and shipping department in 1956 and in 1957 became assistant foreman in the kiln departments in plants 2 and 6. In August of 1959 he was made a supervisor in the industrial engineering department, a post he held at the time of his present appointment.

* * *

He is a graduate of Massachusetts Institute of Technology and before coming to Norton, had been a foreman at the Corning Glass Works.

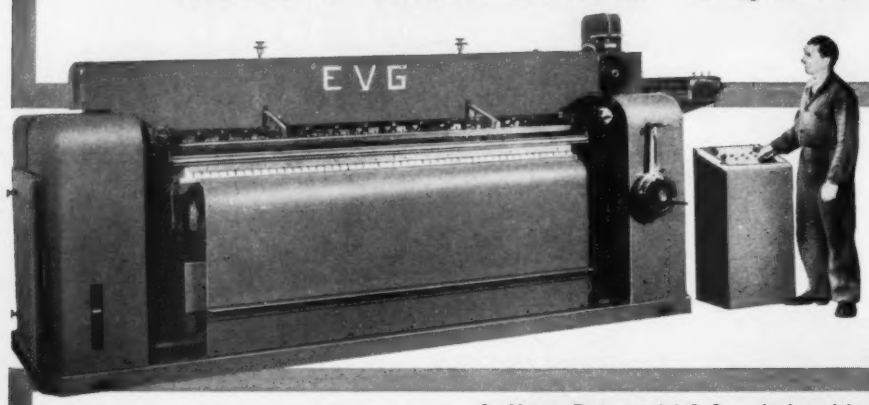
Heads Insect Wire Screening Bureau

Wilmer B. Thompson, president of **Dodge Wire Corporation**, Covington, Ga., has been reelected president of the Insect Wire Screening Bureau for a second term.

* * *

The bureau, an industry-wide association of insect screening manufacturers, held its annual

COMPLETE LINE OF FULLY AUTOMATIC MESH WELDING EQUIPMENT



EVG designs and builds the world's most complete line of wire fabric welding machinery—five complete plants covering the entire field of welded mesh. Wire sizes from 7/0 to 25 gauge; all conventional spacings, down to 4 mesh (¼" x ¼").

Special plants can be engineered to customer's specifications.

EVG

COVERS THE WHOLE FIELD OF WELDED WIRE FABRIC

1. **Heavy Duty** model G 6 — designed to handle the heaviest meshes in use, i.e., pipe meshes.
2. **Standard Duty** — handles all constructions specified by engineers for reinforcing road fabrics.
3. **Medium Duty** — a specialized machine for the low-cost production of building mesh and similar fabrics.
4. **Light Wire** machine — a high precision welder, specifically designed for the production of visual type fabrics; fencing, mink batteries, etc.
5. **Fine Wire** machine — an extra high speed, flexible changeover welder. Particularly suited to the production of welded hardware cloth in all gauges and spacings.

Please direct inquiries to: **RICHARD E. KLEINHANS** *U. S. — Canadian Representative*

122 East 42nd Street, New York 17, New York • OXford 7-0770

meeting at the Cloister, October 30th through November 1st.

* * *

Elected vice-president of the organization was **C. A. Ten-Hoopen,** vice-president of the **American Steel and Wire Division** of United States Steel Corporation.

Rea Magnet Wire Appointments

Elevation of four officers and appointment of one new officer of **Rea Magnet Wire Company, Inc.,** division of **Aluminum Company of America,** has been announced.

* * *

The four incumbent officers elected to new positions are **Robert L. Whearley,** president; **Allen C. Sheldon,** executive vice president; **Ira M. Belcher,** secretary-treasurer; and **George T. Cook,** comptroller and assistant secretary-treasurer. **James L. McKinley** has become an officer with his election as vice president of sales.

* * *

Mr. Whearley was most recently Rea executive vice president. A veteran of 40 years in the magnet wire industry, he has been with Rea since 1934 and director of the company since 1950.

* * *

Mr. Sheldon, most recently vice president, operations, and secretary for Rea, joined the company in 1950 as assistant plant manager, subsequently serving as plant manager and vice president, manufacturing. He is a graduate of Iowa State University, with a B. S. in chemical technology, and of Harvard University, with a Master of Business Administration. He has been a director of the company since 1954.

* * *

An electrical engineering honor graduate of University of Arkansas, Mr. McKinley joined Rea in 1957 as general sales manager, serving in that position until his current election.

* * *

Mr. Belcher joined Rea in 1949 as accountant. He was subsequently elected assistant treasurer and controller, the position he most recently held. He is a graduate of International Accounting Society and Walton School of Commerce.

* * *

With Rea since 1951, Mr. Cook served successively as accountant, assistant secretary, and assistant secretary-treasurer, until his recent election. He is a graduate of University of Illinois, with a B. S. in accounting.

Oakite Appoints New Representatives

Oakite Products, Inc. has announced the appointment of two new technical service representatives to the company's field organization, **Robert D. Casey** and **Michael D. Juliana.**

* * *

Mr. Casey will represent the company in Arizona, with headquarters in Phoenix. Mr. Juliana has been appointed to the Charleston, West Virginia territory.

* * *

The two new representatives

the latest HIGH SPEED
TUBULAR STRANDING MACHINE
from HANSON & EDWARDS . . .

. . . for the cable and wire rope industries.

* External wire guides increase efficiency—reduce "down-time"—provide quick, easy threading.
* Overall dimensions reduced—increased speed.
* Electro-mechanical or electrically operated air brakes to choice.
* Rotor runs in large split roller bearings.
* Direct gear-driven capstan gives positive lays.

19-12½ bobbin machine, one of the new models now in production. The capstan unit, with cantilever mounted haul-off sheaves, is a complete separate unit coupled by shaft and flexible coupling to the main machine.

HANSON & EDWARDS LTD
WARRINGTON ENGLAND

SALES ORGANISATION:
JAMES DAY (MACHINERY) LTD 28 MADDOX STREET LONDON W1

U.S. AGENTS:
THE EDMANDS COMPANY 860 WELLINGTON AVENUE CRANSTON 10, R.I.

P5078

completed an intensive seven-week training course in the New York laboratories of the firm, which specializes in industrial cleaning and surface treatments for metal.

Named to Riverside-Alloy Sales Office

Joseph Whinney, 28, was named to the Chicago District sales territory of **Riverside-Alloy Metal Div., H. K. Porter Company, Inc.** He will cover southwestern Ohio, Kentucky and the southern half of Indiana from Cincinnati, Ohio.

* * *

He joined the Division in November, 1959, and has worked in each of the company's mills and in the inside sales department, as well.

Tessmann Joins Central Cable

Alfred H. Tessmann has been appointed Vice President of **Central Cable Corporation** of Jersey Shore, Pa., to be in charge of the Southern Division with headquarters in Tucker, Georgia. He was the founder and former Vice President of the **Southern Electrical Corporation** at Chattanooga, Tenn.

English Wire Official Retires

John Charles Moston will retire at the end of this year from his executive duties as Director and General Manager of Connollys (Blackley) Ltd., Manchester, England, manufacturers of insulated electric wire and cable.

* * *

Mr. Moston, a member of The Wire Association for the last 29 years, has named **P. H. Walton,** B. Eng., M.I.E.E., M.I.M.E., the company's Chief Engineer, to replace him as an Association member.

Driver-Harris Executive Retires

Edward J. Davies, Manager of Manufacturing for the **Driver-Harris Company,** Harrison, N. J. has retired to devote his time as a lecturer in the educational program of the United States Power Squadrons and as Flotilla Commander in the U. S. Coast Guard Auxiliary.

* * *

Mr. Davies started his career in 1917 with Heller Bros. Steel Works in Newark, N. J. He joined Driver-Harris in 1923 as superintendent of the hot rolling mill, was made General Superintendent in 1939 and Manager of Manufacturing and Assistant Vice President in 1957. He resides at Gooseneck Point, N. J., on the Jersey shore. He had been a member of The Wire Association for many years.

* * *

Mr. Davies will be replaced in the Driver-Harris organization by **William A. Marshall.**

Made General Manager of Dominion Steel's Montreal Plant

The Dominion Steel and Coal Corporation Ltd., has announced the appointment of **Peter Bennett** to the post of General Manager of the company's Montreal Works in Montreal, Quebec.

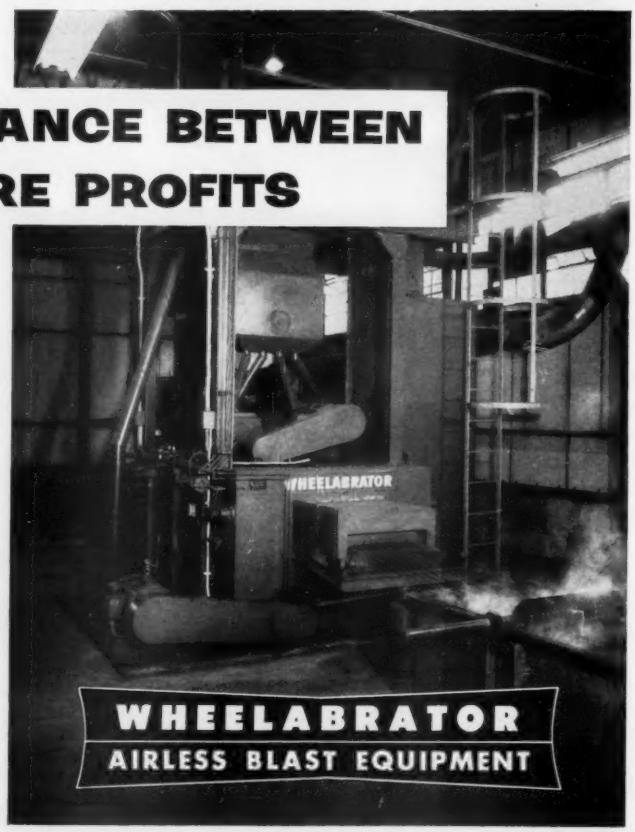
EXECUTIVE REPORT #25

THE SHORTEST DISTANCE BETWEEN STEEL ROD AND WIRE PROFITS

Wheelabrator® Straight-Line Cleaning, Patenting, Coating

At Leschen Wire Rope Division of H. K. Porter Co., Inc., 12 strands of hot-rolled rod go simultaneously through patenting, cleaning and coating in one continuous operation. Wheelabrator mechanical blast descaling is the essential step that makes this efficient processing possible. The blast descaling process eliminates the problems associated with acid pickling, and makes additional savings in time and labor costs.

This efficient production line operates continuously for 24 hours a day, 5 days a week without down time. Investigate the benefits you can realize with this new process for cleaning any type of ferrous or non-ferrous hot rolled rod and bar stock for cold drawn products. Write to Wheelabrator Corp., 389 S. Byrkit St., Mishawaka. Ind. In Canada, P. O. Box 490, Scarborough, Ont.



New Loewy Export Manager

The appointment of **Hans M. Klopfer** as Export Sales Manager for Loewy Products has been announced by the **Industrial Equipment Division** of **Baldwin-Lima-Hamilton Corporation.** Mr. Klopfer, a mechanical engineer and metallurgist, has been associated with the foreign business of the Loewy group for two decades working in close connection with **J. W. Lourie,** Director of Foreign Sales, Baldwin-Lima-Hamilton.

Four Men Added to Electric Wire & Cable Management Committee

In a move to bring the Electric Wire and Cable Management Committee of **The Wire Association** up to its authorized number of members, four men were recently addeded to the committee's roster. These men are:

J. K. Gillett, Pres.
Industrial Equipment Co.
Englewood, N. J.

Duncan M. Gillies, Pres.
Duncan M. Gillies Co.
West Boyleston, Mass.

Michael M. Suba
Product Sales Mgr. — Polyolefins
Union Carbide Plastic Co.
New York, N. Y.

Dr. Robert C. Williams
Vice Pres. — Research
The Ironsides Co.
Columbus, Ohio

* * *

These appointments, which bring the membership of the Committee to a total of 25, were authorized at the Spring Meeting of the Electric Wire & Cable Section last June in Philadelphia.

Edward H. Lewis

Edward H. Lewis, president of Western Insulated Wire Co., Los Angeles, died suddenly on October 4, 1960, at the age of 63. Mr. Lewis will be recalled by many of our members for the interesting paper he delivered at the Regional Meeting of **The Wire Association** in Los Angeles last June. The paper, "Cables — World Wide Today", was published in the August issue of **Wire and Wire Products.**

Theodore H. Wickwire, Jr.

Theodore Harry Wickwire, Jr., died at the age of 81 on October 27, 1960. He was a graduate of Phillips Academy, class of '98 and of Yale University, class of '03. He resided in Narberth, Pa.

* * *

At the time of his death, Mr. Wickwire was chairman of **Trent, Inc.,** manufacturers of industrial heating equipment, in Philadelphia, Pa.

* * *

He was a native of Cortland, N. Y., where he started as a chemist for **Wickwire Brothers,** steel wire manufacturers. In 1907 he moved to Buffalo where he assisted in the formation of the **Wickwire Steel Company,** which, through a series of mergers, led to the formation of the **Wickwire Spencer Steel Corporation,** of which he was president until 1925. This company later became a division of **The Colorado Fuel & Iron Corporation.**

EXECUTIVE REPORT #30

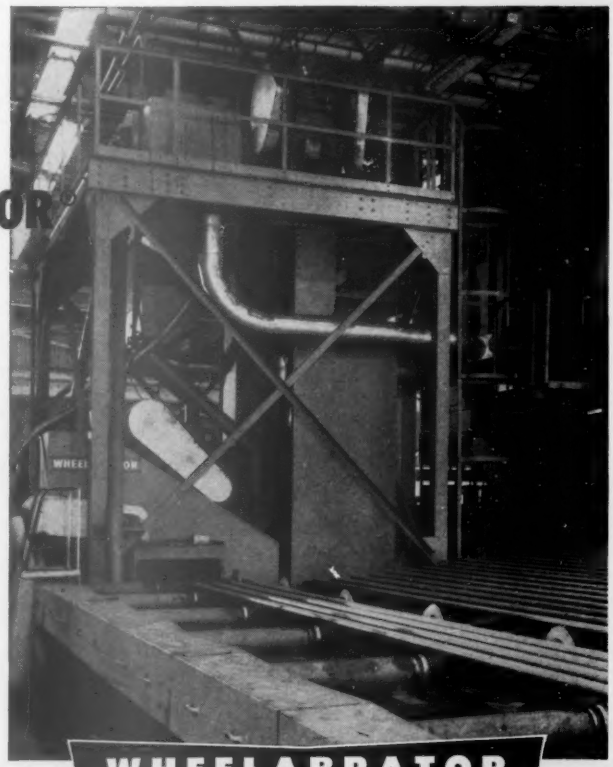
AUTOMATED DESCALING WITH THE WHEELABRATOR

The bar stock cleaning line in the new two million dollar Elyria, Ohio, Cold Draw plant of The Western Automatic Machine Screw Co., Div. of Standard Screw Co. utilizes one of six Wheelabrator descaling machines that have completely eliminated pickling in this modern plant.

On the bar line, the Wheelabrator enables one man to handle the entire operation, from receipt of bar bundles, through an unscrambler, transfer to feed roll conveyors, through the Wheelabrator, and out onto a storage rack in line with the draw bench. For over 16 months of operation, round, square and hex bar stock, up to 4½" diameter in 15' to 45' lengths, has been descaled without any of the old acid pickling headaches. In addition, Western Automatic reports that Wheelabrator descaling provides a definitely superior product for subsequent cold drawing.

How To Automate Your Bar and Wire Drawing Lines

Details of Wheelabrator's cost-saving descaling method are illustrated in Bulletin 148-D. Write to Wheelabrator Corp., 389 S. Byrkit St., Mishawaka, Indiana. In Canada, P.O. Box 490, Scarborough, Ontario.



WHEELABRATOR
AIRLESS BLAST EQUIPMENT

ASM's Metal Show

The big 1960 Metal Show is a matter of history. Held in 1960 in Philadelphia's Convention Hall, the exhibitors were classified as belonging to eleven groups: Ferrous Metals; Non-Ferrous Metals; Related Engineering Materials (such as plastics); Nuclear Materials; Tool Materials; Industrial Heating; Cleaning and Finishing; Welding and Joining; Testing, Inspection, Control and Research; Metals Production; and Parts, Forms and Shapes.

* * *

Formal opening ceremonies took place at 11:00 A.M. on October 17, with **Allan Ray Putnam,** Managing Director of the 33,000 member Technical Society, serving as master of ceremonies in introducing the speakers: **Max D. Howell,** Executive Vice President of the American Iron & Steel Institute; **Norman W. Foy,** Chairman, Committee to Promote the Use of Steel, also of AISI; **Carl Pihl,** Secretary, Copper & Brass Research Association; **R. B. McKee,** Vice President-Sales, Aluminum Company of America; and **F. R. Mann** of the City of Philadelphia, who welcomed the ASM to the city and paid tribute to the Metal Show on behalf of the Mayor.

* * *

Following brief addresses by the foregoing, **Walter Crafts,** President of the American Society for Metals, cut an 8-foot aluminum plate sealing the entrance with an arc torch, opening the way into the Steel Arena through which the assembled officials and guests made the initial entry into the Metal Show.

* * *

The show itself was comprised of a large representative number of exhibitors whose products and processes presented an excellent cross-section of the entire metalworking industry.

* * *

Presented concurrently with the exposition and complementing its educational impact was the National Metal Congress — the technical meetings. A number of other technical societies participate with American Society for Metals in this comprehensive series of technical papers, panels and symposia on engineering and scientific aspects of metalworking.

Power Transmission Catalog

Wood's Catalog 23103 describes and illustrates company's complete line of mechanical power transmission equipment. Products covered include variable speed drives of both motion and stationary control types; conventional v-belt and Ultra-V belt drives; Timing Belt drives, flat belt pulleys, flexible and rigid couplings, adjustable motor bases; ball bearing pillow blocks, flange and take-up units; solid and split sleeve pillow blocks; cotton-card drives; cotton cleaner drives; bushings.

* * *

Write T. B. Wood's Sons Co., Chambersburg, Pa., for a copy.

USED STRANDER AVAILABLE

1-SYNCRO MACHINE COMPANY 61-WIRE, 22" DIAMETER PLANETARY STRANDER, CONSISTING OF:

1 — 6-BOBBIN SECTION
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ARRANGED IN TANDEM
1 72" DIAM. SINGLE CAPSTAN
1 84" TAKE-UP STAND

THIS MACHINE IS COMPLETE IN EVERY DETAIL AND CAN BE SEEN IN OPERATION. FOR FURTHER DETAILS WRITE OR TELEPHONE

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WE BUY . . . WE SELL

A Review of Recent Wire Patents

The data listed below is only a brief review of recent patents pertinent to the readers and subscribers of this publication.

Complete copies of these patents may be obtained by writing to the publisher of this magazine and remitting 50¢ for each copy desired. For orders received from outside the United States the cost will be $1.00 per copy.

No. 2,954,964, WIRE FENCES HAVING MEANS TO RENDER THEM IMPERVIOUS TO LIGHT AND AIR, patented October 4, 1960 by Thomas E. O'Haffey, 400 E. Roosevelt St., Phoenix, Ariz.

A Cyclone-type wire fence is disclosed having zig zag bends linked together to form diamond shaped mesh structure, the bends including flat portions and vertical hump bend portions providing depths to the bends so that there are parallel rows of humps extending angularly on the mesh which define angularly extending channels adapted to releasably retain notched and curved metal strips.

* * *

No. 2,955,065, METHOD OF REPAIRING A WIRE-REINFORCED CONVEYOR BELT, patented October 4, 1960 by Francis Victor Frederic Paul, Paris, France, assignor to Societe anonyme dite: Pneumatiques & Caoutchouc Manufacture Kleber Colombes, France.

A method of repairing a conveyor belt having a ply of rubber composition with longitudinal reinforcement wires embedded therein and wherein some of the wires have been damaged and which method includes removing the underfacing of the belt around the damaged area, cutting out the damaged wires and removing them, inserting replacement wires embedded in a repair strip, connecting the wires and applying an underfacing over the repaired area.

* * *

No. 2,955,192, WIRE GUARD AND METHOD OF MAKING THE SAME, patented October 4, 1960 by Henry B. Cohen, 2430 N. Hancock St., Philadelphia, Pa.

Wire guard screens are covered in this patent, having metal frames through which the ends of the wires initially project but are subjected to heat sufficient to melt the ends and adjacent portions of the frames to weld the same together.

* * *

No. 2,955,622, SKEIN WINDING FIXTURE FOR MINIATURE SKEIN-WOUND STATORS, patented October 11, 1960 by Douglas L. Spotten and Gerald E. Hinderer, Baltimore, Md., assignors, by mesne assignments, to the United States of America as represented by the Secretary of the Air Force.

It is stated that the wires are protected from damage or breakage when mounted upon and being removed from the stators and for insuring automatic winding of the stators.

* * *

No. 2,956,017, WIRE DRAWING LUBRICANT CONTAINING A DIAMIDE, HYDRATED LIME, AND A NORMAL CALCIUM SOAP, patented October 11, 1960 by William Maurice Franks, Rockfall, Conn. assignor to Nopco Chemical Company, Harrison, N. J., a corporation of New Jersey.

A wire drawing lubricant is disclosed consisting of a dry mixture of from about 5% to about 15% by weight of a diamide having a melting point above about 130° C., this diamide being the reaction product of ethylene having a carbon chain length of from about 12 to about 18 carbon atoms, and from about 85% by weight to about 95% by weight of a high calcium content composition comprising hydrated lime and a normal calcium soap of a saturated aliphatic monocarboxylic acid having a carbon chain length of from about 12 to 18 carbon atoms, the hydrated lime comprising from about 35% to about 65% of the total weight of the high calcium content composition.

* * *

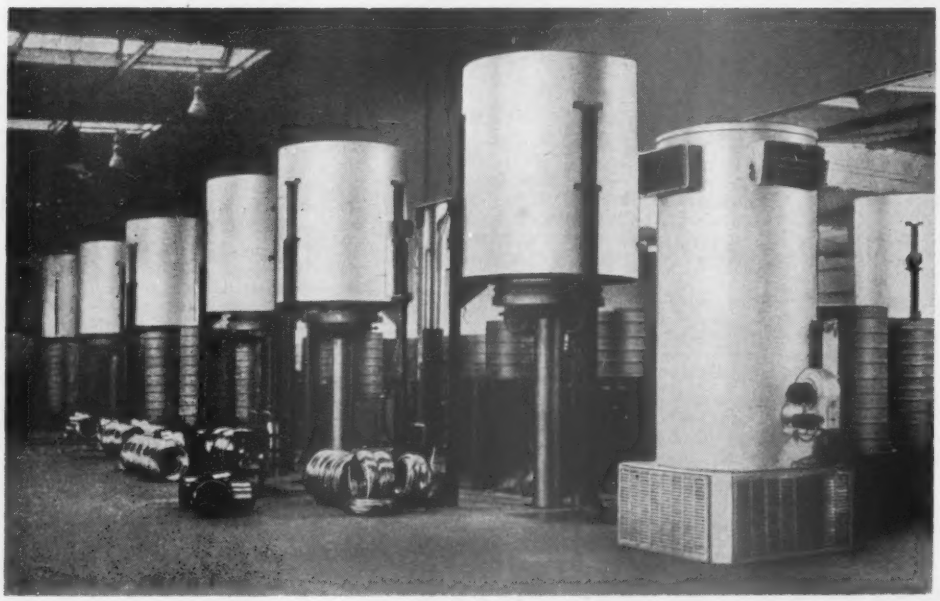
No. 2,956,102, TWISTED CONDUCTORS AND CABLES, patented October 11, 1960 by Joseph C. Lilly, Plainfield, Conn., assignor to The Plastic Wire & Cable Corporation, Jewett City, Conn., a corporation of Connecticut.

A cable is patented comprising a number of pairs of twisted electrical conductors of indefinite length, each pair having the twists therein of continuously varying random lengths with no fixed pattern of twist variation whereby the wires in the adjacent pairs are in transposed non-conductive relation.

* * *

No. 2,956,311, METHOD OF FORMING A SUSPENSION-TYPE ELECTRIC TRANSMISSION CABLE, patented October 18, 1960 by Ulrich Raydt and Karl Heinz Hahne,

THE LAST WORD IN MODERN EFFICIENT DESIGN!



SEVERAL VACUUM BRIGHT ANNEALING UNITS WHICH WE HAVE INSTALLED IN ONE OF THE MOST PROMINENT CABLE WORKS IN GERMANY

(German and Foreign Patents)

*

SOLE REPRESENTATIVE:
PAUL REICHER
Machinery & Equipment
600 Eglington Ave., East,
Toronto 12, Ont., Canada

WRITE TO: FRITZ INDUSTRIAL FURNACES HAGEN, P. O. B. 448 (W.-GERMANY)

Osnabruck, Germany, assignors, to Osnabrucker Kupfer - und Drahtwerk, Osnabruck, Germany, a corporation of Germany.

A method of producing a suspension-type electric transmission cable is disclosed, for a cable having a common coating upon a core and a support which are radially spaced apart by a web defined by the material of the coating.

* * *

No. 2,956,390, TAKE-UP FOR CABLE STRANDING APPARATUS, patented October 18, 1960 by Charles H. Crosby, Cranford, Frank Wahl, North Bergen, and Roger R. Wahlberg, Bloomfield, N. J., assignors to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

There is disclosed a control system for conditioning a cradle of a cable strander for unloading from and loading therein take-up reels at a given position after de-energizing a motor which has been driving the cradle at a normal operating speed and under the control of circuits jointly controlled by start and stop switches to render a brake active to stop the cradle when the motor is de-energized.

* * *

No. 2,956,391, CABLE-FORMING APPARATUS, patented October 18, 1960 by Georg Demmel and Wilhelm Wirth, Berlin-Siemensstadt, Germany, assignors to Siemens-Schuckertwerke Aktiengellschaft, Berlin, Germany, a joint stock company of Germany.

Seventeen claims to this patent for apparatus comprising supply drums uniformly distributed about an axis for holding individual supplies of wire strands, a twisting station on the axis, winding drum feeding devices for feeding individual strands from the supply drums through the twisting station to the winding drum, the feeding devices including pulling sheaves uniformly distributed about the axis between the supply drums and the twisting station and individually coordinated to the supply drums, and an equalizing mechanism interposed between the pulling sheaves and the twisting station and comprising pairs of rollers uniformly distributed about the axis, each pair being mounted for cooperation with one of the strands, the mechanism further including resilient means for mounting the rollers of each pair at at variable distance depending on the tension of the associated strand.

* * *

No. 2,956,689, ARTICLES CONSISTING AT LEAST PARTLY OF PLASTIC COATED METAL WIRE, patented October 18, 1960 by Jan van der Togt, Zwijndrecht, Netherlands, assignor to Tomado N. V., Dordrecht, Netherlands.

More specifically, this invention relates to such articles as racks for drying clothes and includes plastic-covered wires with a protective short sleeve of resilient material at the crossing wires, with the plastic material extending to the sleeve.

* * *

No. 2,956,754, COMB WINDING GUIDE, patented October 18, 1960 by Walter D. Engelhardt, Corona del Mar, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif., a corporation of California.

A guide for controlling the spacing of turns of wire wound on a mandrel in a winding machine is disclosed and comprises a length of comb material having a thin edge; a number of grooves in the edge, the centers of the grooves being substantially equally spaced along the edge, and progressively decreasing to a minimum width in a direction away from the winding point; and a device for urging the edge against the turns on the mandrel adjacent the winding point.

* * *

No. 2,957,406, WIRE TYING MACHINES, patented October 25, 1960 by William Oranmore Copland, Appleton, near Warrington, Douglas Stewart Faulkner, Lower Walton, near Warrington, Horace Bartlett Merriman, New Malden, and Robert David Sansum, Hounslow, England, assignors to Gerrard Industries Limited, Brentford, and Rylands Brothers Limited, Warrington, England, jointly.

The wire machine includes a table for the support of a coil of wound wire, a work head movable vertically relatively to the table and within the coil and including a central post and wire gripping jaws operable against the central post to grip the wire therebetween, a feeder carried in the work head to feed out tying wire beneath a supported coil, a device to raise the work head to bring the wire gripping jaws therein to a position whereby the free end of the wire passed about the coil may be gripped between one of the jaws and the central post, means to reverse the feeder for tightening a loop of wire about the coil, means for revolving the gripping jaws to form a twisted tie, and to sever the wire from the feed out means.

* * *

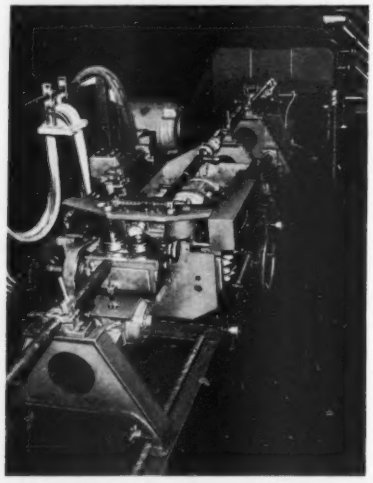
No. 2,957,540, FIRE ESCAPE CAGE, patented October 25, 1960 by Elmer J. Brown, 423 N. 5th St., Bismarck, N. Dak.

This cage is constructed of crossed wire lengths extending from corner and border rods.

LOMATIC

COMBINED DRAWING STRAIGHTENING CUTOFF AND POLISHING MACHINE

Payoff - Drawbench - Straightener



Flying Shear - Polisher - Discharge

Now available in two standard sizes, the revolutionary LOMATIC machines handle ferrous and non-ferrous rods and tubes at speeds up to 200 ft. per min. and with drawing capacities up to 16,000 lb. Compared to conventional separate rod drawing, straightening, polishing and cutting-to-length operations, the LOMA single-operation fully automatic machine offers the following major advantages:

- Greater output rate — continuous operation at high speed
- Reduced labor cost — only one operator required
- Improved straightness — stock is straightened in two planes
- Perfect concentricity — obtained by straight-line drawing action
- Higher surface finish — due to two-stage polishing unit

The complete line comprises an uncoiler, a pre-straightener, a drawbench, a roller straightener, a flying cutoff, a polishing machine and a discharge table. All components required for the complete sequence of processing operations are interlocked mechanically and electrically into one integrated and synchronized line which is controlled by only one operator.

Our standard line of equipment includes:

- Casting Machines and Molds
- Saws and Cut-off Machinery
- Hot and Cold Rolling Mills
- Rod and Tube Draw Benches
- Roller and Stretcher Levellers
- Air and Hydraulic Tube Testers

LOMA
MACHINE MFG. CO., INC.
114 East 32nd Street
New York 16, N. Y.

No. 2,957,634, MECHANICAL MOVEMENT FOR COIL WINDING MACHINE, patented October 25, 1960 by Edward J. King, Jr., Leawood, Kans., assignor, by mesne assignments, to Collins Radio Company, Cedar Rapids, Iowa, a corporation of Iowa.

A toroidal coil winding machine is disclosed of the type employing a split ring bobbin insertable in a coil form.

* * *

No. 2,957,640, WIRE COILING MACHINE, patented October 25, 1960 by Thomas E. Lewis, Jr., Trumbull, Conn., assignor to The Coulter & McKenzie Machine Co., Inc., Bridgeport, Conn., a corporation of Connecticut.

More specifically the invention relates to a device for rotating a captan and a drum in synchronism, with the capstan driving the drum; a device for relatively shifting the capstan and the drum to move the same into and out of driving engagement; and a device for accumulating the wire coils which continue to issue from the capstan when the drum and capstan are disengaged.

* * *

No. 2,957,643, REEL FOR WIRE COILS, patented October 25, 1960 by Delbert B. Bosworth, Cumberland Center, and Charles E. Jackson, South Portland, Maine, assignors, by mesne assignments, to Chicago Bridge & Iron Company, Chicago, Ill., a corporation of Illinois.

This reel includes a guide for frictionally guiding the wire after it leaves a pulley coaxial with and spaced arcuately from the zone of engagement of the wire as it comes from the guide so that when wire is pulled through the frictionally guiding means of the reel the pulley is rotated, overrunning of a rotor feeding wire through the wire guide at an accelerated rate thus to disengage it from the pulley.

* * *

No. 2,957,646. COILING STRAND MATERIAL, patented October 25, 1960 by Eben Jefferson Crum, c/o Wirecrafters Inc., Box 6763, Baltimore 4, Md.

A portable package is disclosed comprising a manufactured strip of elongated material, as wire, in the form of a series of continuous consecutive loops, these loops being arranged one above the other in a helical pattern, each loop being superimposed on and eccentrically disposed relative to its adjacent loops along the circumference of a circle.

* * *

No. 2,657,671, BENT WIRE STAYING DEVICES FOR ARTICLE SUPPORT, patented October 25, 1960 by Joseph A. A. Messier, R.F.D. I, East Montpelier, Vt.

A bent wire staying device to be fastened against the front surface of a perforated wall board containing a number of anchorage holes is covered by this patent, including a bent length of stiff bed wire having a jog anchored in swivel permitting engagement with a first one of the holes and having an end portion engaged retentively with the rear surface of said board, the wire having a continued portion of its length bent to sinuous shape in a mainly uniplanar course paralleling the front surface of the board and extending closely proximate a different one of the holes, and a stay wire for immobilizing the bed wire.

Portable Steel Wire Temperature Indicator

This new addition to the Addison line of instrumentation is designed to provide accurate temperature measurements of steel wires during drawing. Thus, markedly higher drawing speeds can be achieved than have hitherto been possible. It can also be used to measure wire temperatures during heat treatment, coating processes, and "In-Line" cleaning.

* * *

At the same time, this new temperature measuring device enables the maximum drawing speeds to be quickly determined for various qualities of steel. As a result, it can be used to form the basic unit of a future system of automation and process control in wire drawing mills.

* * *

The instrument operates on a thermo-couple principle; two pulleys of dissimilar metals being pressed against the moving wire. The signal generated by this thermo-couple effect is applied to the measuring unit, which is calibrated directly in temperature over the range 120°F to 570°F. The instrument has a response time of only

The PESCHEL line

ELECTRICAL TEST EQUIPMENT FOR THE Wire Industry

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Model S14CV — AC/DC

FEATURES: RUGGED CONSTRUCTION WITH LONG LIFE SELENIUM RECTIFIERS • ACCURATE AT ANY SPEED • DC OR AC OUTPUT • FOR USE ON EXTRUDER OR RESPOOLER. ANY SPEED • 400 FPM WITH 1" ELECTRODE (2400 FPM WITH 6" ELECTRODE) • RELIABLE OPERATION DOWN TO 5% OF MAXIMUM OUTPUT VOLTAGE • SIMPLE TO OPERATE BY INEXPERIENCED PERSONNEL.

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5 to 10 seconds and is suitable for wire sizes of 7 to 14 AWG and wire speeds of 50 to 3000 feet per minute.

* * *

For additional details, write **Muirhead Instruments, Inc.**, 441 Lexington Ave., New York 17, N. Y.

New Tube & Bar Straightener

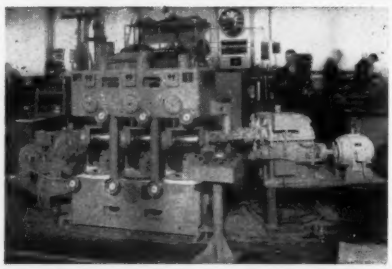
Straus-Artys Corp., 45 No. Station Plaza, Great Neck, N.Y., announces the newest addition to its line of tube and bar straightening machines, Model VRN-000, manufactured by **Kieserling & Albrecht**, Germany.

* * *

This new small straightening machine with vertical straightening rolls is made for the accurate straightening of sizes from ⅛" to approximately ½" diameter. It is especially designed for tubing with thin walls and where special surface finish is required.

* * *

An important new feature of this machine is that it will also straighten the ends of the tubing. The machine comes equipped with three straightening speeds. All three roller pairs are motor driven. The three top rolls and the middle



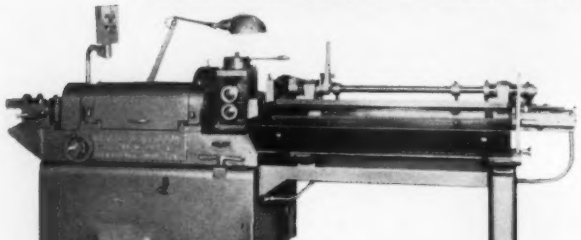
lower roll are vertically adjustable.

* * *

Further information and literature on this and other tube and bar straightening machines are available on request.

GEO. C. PATTERSON
HI-SPEED
AUTOMATIC WIRE STRAIGHTENING & CUT-OFF MACHINES

ELECTRICALLY OPERATED
with VARIABLE SPEED DRIVE



PATTERSON No. 2A
3 FT. MACHINE

We are proud to present this machine & 35 additional models to the mills and fabricators of wire, for we honestly believe they are top value in their field today. We have spared no expense to give you a precision machine tool that will give years of uninterrupted service. All iron castings are close grained Meehanite iron; cut-off and opener levers are high grade steel castings; all guides are hardened tool steel; electrical equipment is wired ready to run.

- MINIMUM COST
- MAXIMUM PRODUCTION
- ACCURATE LENGTHS
- NEW FEATURES

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"Who Buys What in the Missile Market"

Innovators Inc., 1258 South Cochran Ave., Los Angeles 19, Cal., has available a Directory of the Missile Market entitled "Who Buys What" which indicates the Buyer of each commodity for every contractor listed. For example, under XYZ Corporation, John Doe is listed as Senior Buyer of machined parts, outside production.

* * *

With the aid of the directory, prospective vendors can contact the most concerned buyer for a particular category of large and medium size manufacturers. This information was compiled the past month and is therefore current.

* * *

The cost of the directory is $12.50 postpaid. Sales tax of 4% must be added to orders mailed to California. A two year subscription with semi-annual revisions is available at $30.00.

Bulletin Describes Tester Accessory For Direct PSI Readings

A new Specimen Dimension Compensator which automatically adjusts test recordings taken on the Scott Model CRE Tester for dimensional changes in specimen thickness, width, diameter, or cross-section is described in a bulletin just published by **Scott Testers, Inc.**, manufacturers of physical

testing equipment for rubber, plastics, textiles, paper, wire and other basic industrial products.

* * *

The bulletin shows how this new accessory facilitates operation of Model CRE as well as ACCR-O-METER Tensile Testers. A close-up photo pictures the 20-step dial control designed to cover the desired range of specimen dimension variations. A typical strip chart recording of a test on a rubber dumbbell specimen is also included to indicate how direct psi chart readings through automatic compensation may be obtained. The Compensator may also be constructed to provide instant test data in kgs/cm^2, grams/tex, or other selected bases. For your copy of the Bulletin on the new Scott Specimen Dimension Compensator, write Scott Testers, Inc., 55 Blackstone St., Providence, R. I.

Plastic Roof Ventilators

Heil Process Equipment Corporation has announced its new solid plastic roof ventilators for removing corrosive fumes. Upblast discharge blows the fumes high into the air, minimizing corrosion to nearby roofs and ground areas, and reducing chances of fumes re-entering the plant. All exposed parts including the housing and impeller built of Heil Rigidon plastic. Nothing to rust. 10 standard sizes, 400 C.F.M. to 15,000 C.F.M. Write Heil Process Equipment Corp., 12850 Elmwood Ave., Cleveland 11, Ohio, for Engineering Data Sheet E-7801.

Amchem Announces New Copper Coating Process

The availability of Cuprodine No. 5, a further development in non-electroplated copper coatings, has been announced by **Amchem Products, Inc.,** (formerly American Chemical Paint Co.), Ambler, Pa.

* * *

The Cuprodine No. 5 process provides increased coating adherence and efficiency and greater uniformity of color over previous sulfuric acid-copper sulfate formulations when applied to carbon and stainless steel wire and stampings. The thin, adherent copper coating acts as a lubricant on the steel to appreciably reduce scratching of the wire, pickup and wear on dies.

* * *

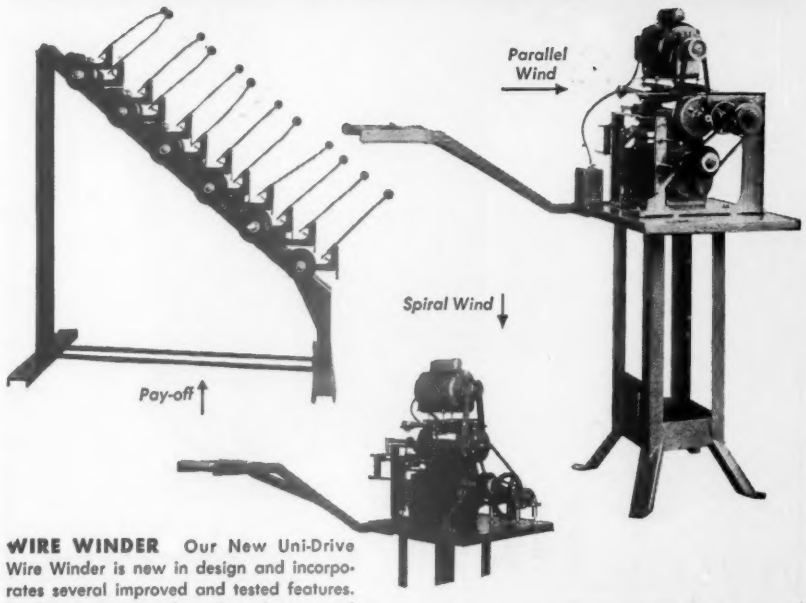
In the treatment of tire bead wire and wire strength members prior to molding and vulcanizing, the uniform Cuprodine coating provides an excellent bonding surface for the rubber. Cuprodine has wide application, as well, in color coding of parts and decorating finished parts with an attractive and durable copper coating.

Keystone Drawn Steel Expands

Willard N. Lynch, Jr., president of **Keystone Drawn Steel Company,** has announced the signing of construction contracts for a $450,000 expansion program. Mr. Lynch said the expansion program will increase Keystone's manufacturing space 40 percent and will double the company's capacity to automatically produce cold drawn and polished steel bars in the popular Keybrite size range.

* * *

STANDARD UNI-DRIVE WIRE WINDER



WIRE WINDER Our New Uni-Drive Wire Winder is new in design and incorporates several improved and tested features. Production is stepped up through increased speed. It produces smooth, even and accurately wound spools of wire in single or multiple ends. All strands parallel — no over or under-winding. Can also be furnished with a slight spiral pattern for winding exceedingly fine wire. Automatic Stop Motion controls each strand. Traverse adjustable from 1¾" to 5½" between spool heads without changing cam. Designed especially for winding wire to be braided and shielded for electrical conductors.

Various types of supply packages that may be wound on Standard Uni-Drive Wire Winder.

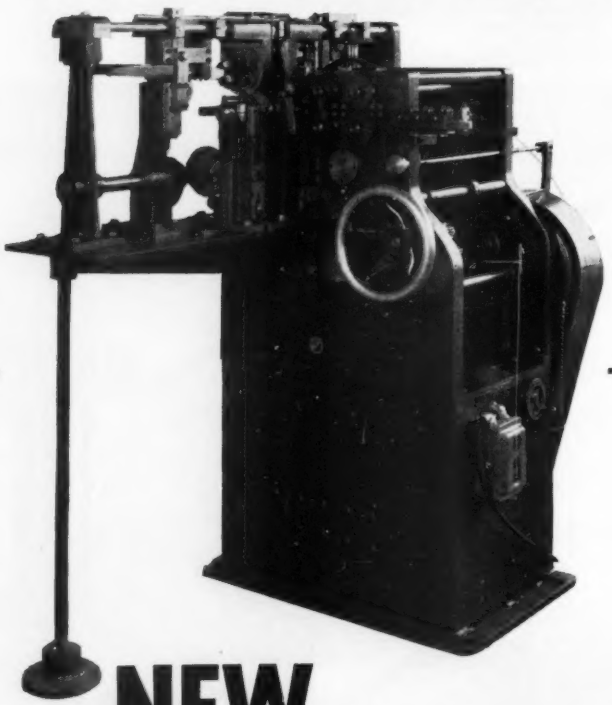
PAY-OFF Our Pay-off Attachment consists of a heavy fabricated frame on which Pay-off spools are mounted to cover desired number of ends to be wound. Equipped with spindles, running on self-aligning ball bearings, with size of spindles and adapters to accommodate customers' pay-off spool. Compensating Attachment to control the tension of each individual strand of wire, applying the same tension when spool is full as when empty. Can also be adapted for use with bunching machines.

STANDARD MILL SUPPLY COMPANY
31 ESTEN AVENUE PAWTUCKET, R. I., U. S. A.

The first phase of the expansion program calls for construction of 26,000 square feet of modern building which will house new, automatic equipment combining the operations of cold drawing, straightening, cutting and polishing steel bars. The expansion will also include new coil handling, storage, welding, cleaning and annealing facilities.

* * *

This is the third major expansion program to be undertaken by Keystone Drawn Steel Company since World War II. In 1952 the company expanded capacity by 40 percent, while eliminating production bottlenecks and providing an orderly flow of material in process. Four years later, in 1956, Keystone initiated the Keybrite product line by pioneering the installation of automatic equipment which could cold draw, cut to length, straighten and highly polish steel bars in one operation.



NEW For Springmakers

AUTOMATIC COILER and LOOPER

WELLS' NEW FULLY AUTOMATIC SPRING COILING AND LOOPING MACHINE coils, trims and loops in sequence. By trimming before looping extremely accurate springs are made. Produces cross-over, machine and side loops, or any combination of these.

Machine shown above handles .025" to .062" diameter wire, forming coils of 3/16" o.d. to 5/8" o.d., 1/2" to 5" long.

Loops on each end can be varied 360° to each other and held to ±3°. Loop openings can be held to ±.010", or less.

Adapted from the WELLS large diameter automatic coiling and looping machines made for several years, this new spring machine will be a boom to manufacturers of mechanical coil springs.

Made By The Producers of the Wells Straightening And Cutting Machines.

Write for information

Frank L. Wells Company

BUILDERS OF FINE WIREWORKING MACHINERY

5821 FIFTH AVENUE • KENOSHA, WISCONSIN

OR — HARVEY SPRING MFG. CO. — 671 N. Sangamon St., Chicago, Ill.

Catalog on Strapping Tools and Supplies

A new 60-page, two-color general catalog covering automatic strapping machines, manually-operated strapping tools, strapping, seals and accessories is available from **A. J. Gerrard & Company**, 400 East Touhy Ave., Des Plaines, Ill.

* * *

The catalog describes and illustrates equipment needed to apply flat, oval and round steel strapping as well as rayon strap and pressure sensitive tape. It contains strapping recommendations for light, medium and heavy weight packages, cartons, bundles, boxes and crates. Details are given on specialty products such as sign hanging kits, cotton band splicers, insulation strapping and rubber pallet bands.

National Electrical Week For 1961

"Make Electricity Work For You" will be the theme of the 1961 observance of National Electrical Week next February 5-11, it has been announced by **Harold A. Webster,** chairman of the National Electrical Week Committee.

* * *

The theme and details of how various segments of the electrical industry can participate in the nation-wide observance are contained in the 1961 National Electrical Week Planning Guide, which is currently being distributed to more than 6,000 industry groups and executives throughout the country.

* * *

"In selecting the theme for the upcoming Week," Mr. Webster said, "the Committee chose a message that could be adapted to all segments of the industry — one to which each participant could add his own interpretation and his own particular message, such as Make Electricity Work for You . . . on the job . . . in the home . . . in the community . . . on the farm, etc."

* * *

Electricity, probably more than any other source of energy, has been responsible for the high standards of living enjoyed by millions of Americans today. The

nation is more productive, healthier, wealthier, and more secure — thanks in large part to the number of tasks electricity performs.

* * *

Mr. Webster urged all members of the industry to begin making observance plans now. He pointed out that the planning guide contains sample programs of activities staged by 16 different communities during the last observance, along with a listing of activities in which a number of individual participants engaged.

* * *

Copies of the 1961 National Electrical Week Planning Guide may be ordered at $1 each from: National Electrical Week Headquarters, Suite 306, 407 North 8th Street, St. Louis 1, Mo. (CEntral 1-1733).

* * *

National Electrical Week is an all-electrical-industry event staged each February during the week of Thomas A. Edison's birthday. It is sponsored by nine industry groups and endorsed by 15 others.

Construction Started on U.S.I.'s Swiss Headquarters

Construction was started recently on a new building to house **U. S. Industrial Chemical Co.'s** European technical service laboratory and sales offices. The new building, located in Baar, Canton of Zug, Switzerland, will be the headquarters of **U. S. Industrial Chemicals Co.-International,** which was formed in November, 1959.

* * *

The Technical Service Laboratory, headed by **Howard W. Woodham,** is designed for polyethylene research, evaluation and service to U. S. I. International's European distributors and customers. European processing and testing equipment will be used to develop and perfect uses of the company's polyethylene resin marketed under the trade name "Petrothene."

Armco Steel to Install Stanat Hot & Cold Mills

Stanat Manufacturing Company announced receipt of an award from **Armco Steel Corporation** for the supply of a Hot Reversing Mill and Cold Strip Mill to be installed at the Armco Research Center in Middletown, Ohio. The order, which amounts to about $150,000, is scheduled for completion in March, 1961.

* * *

The Hot Mill includes provision for rapid reversal and reduction of hot billets to be reduced to strip and coiled under tension in the 2-high/4-high Cold Mill. Both mills will be powered by DC drive systems including motorized screwdowns. The Cold Mill will feature a unique, hydraulically operated collapsing mandrel and coil stripping arrangement to facilitate coil handling.

* * *

Both mills can be operated as 2-high or 4-high back-up driven units in addition to which the cold mill can employ 4-high direct work roll drive.

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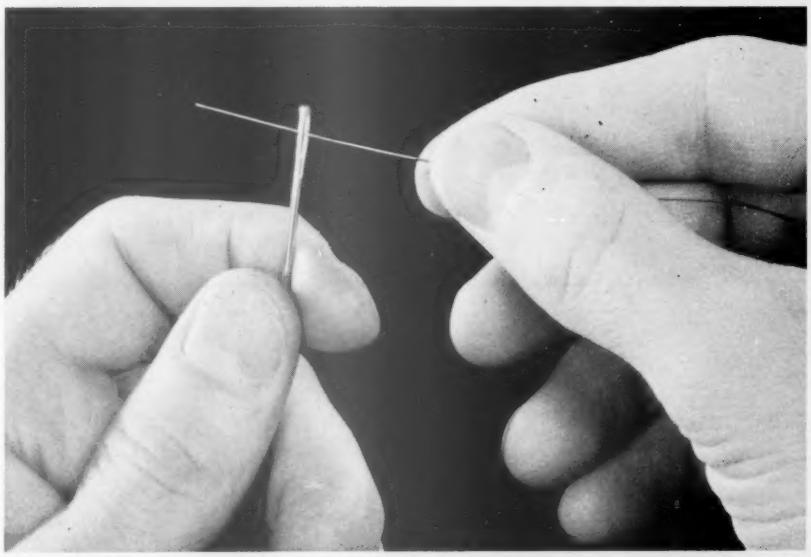
ALLOY WIRE:
Tailor-made for Specific Purposes



Precision Drawn **Strand Annealed** Wire

THESE BASIC ADVANTAGES ARE BIG ONES:—

- Closer in tolerances than most commercial wires
- Make important savings in finished products possible
- Tailor-made with special characteristics to meet specific needs

Drawing specialty wire to consistent fine tolerances with specific characteristics of tensile, elasticity, hardness, grain size, etc., demands *exacting control* through all production phases. When applied to specific requirements, these "Specials" also require extensive know-how and advanced production facilities.

As a leading producer of finest quality paper mill wire cloth, woven mesh and cold drawn wire, our production team of metallurgists, engineers and technicians can help you select the right wires for any application and deliver them "on schedule."

WISCONSIN WIRE WORKS
APPLETON · WISCONSIN

Catalog on Wire Rope Slings

A revised edition of the Wickwire Wire Rope Slings Catalogue has been issued by **The Colorado Fuel and Iron Corporation.**

* * *

The 84 page catalogue describes, illustrates and gives detailed specifications of the complete line of Wickwire Wire Rope Slings. A separate section is devoted to each of the major types of Wickwire Slings, complete with illustrations and charts.

* * *

In addition, the booklet contains information on how to choose and use the slings and illustrated instructions on the basic rules of hitching.

* * *

Copies may be obtained from the Wire Rope Sales Department of The Colorado Fuel and Iron Corp., Palmer, Mass.

New Flux Discovery

Even metal surfaces normally resistant to fluxing can now be soldered with a new printed circuit flux produced by **Alpha Metals, Inc.,** Jersey City, N. J.

* * *

A liquid rosin flux, this new product is called Alpha 346-35. Its effectivness was proved by subjecting it to a grueling, 42-day, high-temperature, high-humidity trial. Examination revealed a noncorrosive, insulating residue.

* * *

Alpha 346-35 is one of a series of liquid rosin fluxes developed for printed circuit dip soldering. Their excellent wetting action and capillarity is described as earning them wide favor in the electronics industry.

* * *

Alpha 346-35, and the other two fluxes in this group — Alpha 346-60 and Alpha 346-20 — are used to manufacture a large variety of electrical equipment units and parts for electronic components and assemblies. The flux has been found to work well with a wide group of metals: brass, bronze, cadmium plate, copper, lead nickel plate, silver, solder plate, terne plate, hot-dipped tin, electrolytic tin plate, tin-zinc plate.

* * *

Additional information may be secured by writing Alpha Metals, Inc., 56 Water St., Jersey City 4, N. J.

Issues Folder on Box Stay Wire

A new folder on box stay wire has just been released by **Prentiss Wire Mills,** Riverside-Alloy Metal Division, H. K. Porter Co. The folder includes pertinent information on box stitching wire.

* * *

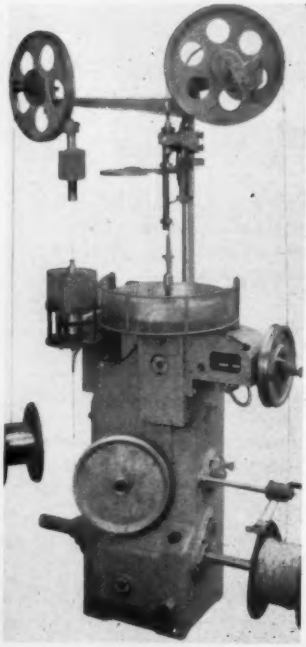
In addition to a brief discussion on the various mechanical properties of Box Stay Wire, the folder contains several useful charts and tables. This data simplifies the problem of selecting the correct wire for each stitching job.

* * *

Free copies may be obtained by writing: Publications Section, Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, N. J.

FOR TELEPHONE CABLES

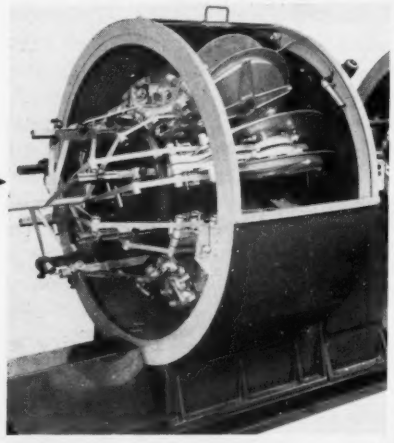
High speed insulating machines



- Paper spindle at 3000 r.p.m.
- String spindle at 8500 r.p.m.
- Paper disc 300 mm
- Traversing take-up reel
- Predeterminating counter
- Automatic stop motion
- 1000 units actually running

FOR HIGH VOLTAGE CABLES

Taping head with 16 papers



- Constant tension braking
- 500 mm paper disc diameter
- Automatic stop motion
- Moveable paper disc for cable diameter variations
- Speed 100 to 350 r.p.m. with speed changer
- Adjustable die

POURTIER MACHINES

76 à 82 rue de la Fraternité

ROMAINVILLE (Seine) FRANCE

Opens New Sales Office In Greensboro

Armco Steel Corporation has announced the opening of a new sales office in Greensboro, N. C.

* * *

Murray B. Wilson, vice president in charge of sales for the company's Armco Division, said the new facility will offer improved service to Armco customers in North Carolina and Virginia. Sales representatives at the Greensboro office, located at 1834 Penbroke Road, are **J. D. Judd** and **R. K. Kingsbury.**

* * *

Armco is one of the nation's major steel companies, with over 90 plants and 400 sales offices, warehouses and oil field stores. Its eastern plants produce a wide variety of carbon and stainless steel flat rolled products and stainless steel bar and wire.

Regalvanize Sheds and Fences

Every industrial plant has the problem of replacing or painting galvanized sheds, roofs, fences and equipment when the zinc has dissipated and rusting occurs. Recoating with organic paints becomes costly and requires frequent attention.

* * *

The Carboline Company has released a new inorganic zinc coating which, when applied over weathered, galvanized metal, gives the same type of galvanic protection as the original galvanizing. Known as Carbo Zinc 11, it is applied by brush, spray or roller as a single coat, 2½ mils thick.

* * *

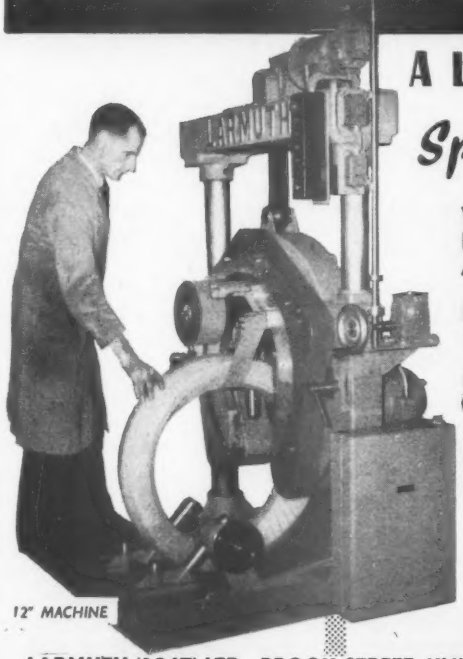
In addition to its excellent weathering and protective properties, Carbo Zinc 11 has unusual application properties. It becomes water-insoluble 20 minutes after application. Sudden rainfalls, dew or condensation will not wash the coating from the surface prior to complete cure. Carbo Zinc 11 can be applied at temperatures as low as 0°F and in humidities as high as 95%. No curing solution is required.

* * *

Conclusive results have been re-

HEAVY COIL WRAPPING MADE EASY WITH LARMUTH'S NEW 12" MACHINE

Now Glues The Paper As It Wraps



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A LARMUTH *Spiral Wrapping* MACHINE

WITH PATENT MECHANICAL LOADING AND EJECTION

FOR COILS UP TO 12" WIDE

PUSH BUTTON CONTROLLED

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Telephone: Knutsford 2244/5

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*

SPECIALIZED ENGINEERING
SPECIALIZED EXPERIENCE
SPECIALIZED MACHINERY
FOR
TWISTING • STRANDING • BUNCHING
Continuous Tension Control
For Precision-Quality

*

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MACHINE CO., INC.
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FOR WIRE ROD THAT'S REALLY FINE--

say NIEDERRHEIN

Niederrhein, Europe's largest wire rod facility with its completely modern installations assures close tolerances for diameter and out-of-round, excellent surface and light scale.

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In Canada: Kurt Orban Canada, Ltd., Toronto, Montreal, Vancouver

Thomas (Basic Bessemer) grades
low metalloid rods
open hearth from C 1005 – 1090
sizes from .200 – 7/8
coils from 180 – 880 lbs.
inside diameters 20, 24, 26, 33½"
Compressed bundles of 3000 lbs now available on request.
Reliable delivery schedules at a fair price.

ported from the field on the use of Carbo Zinc 11 over galvanized surfaces. In the laboratory, Carbo Zinc 11 coated steel panels exposed in a Weatherometer show no rusting after 5500 hours — equivalent to 13 years of actual service in the field.

* * *

Additional information and technical data may be obtained from the Carboline Company, St. Louis 17, Mo.

Automated Nail Packaging Line Cuts Costs 50%

A system for the automatic packaging of nails that will enable American nail manufacturers to resist foreign competitors who are selling more than 40 percent of the domestic market has been announced by the newly-formed New Products Division of The Mead Corporation. The company is one of the nation's leading paper and paperboard products manufacturers.

* * *

Allyn C. Beardsell, Director of the division, said the system is being adapted to the packaging and handling of other elongated or sharp metal objects as well as free flow materials, including items as diversified as screys, bolts, shotgun shells, and even detergents. As applied to nails, the automated method cuts costs as much as 50 percent.

* * *

A key to the system is a new heavy-duty corrugated paperboard carton with three plies on its bottom, and two on its four sides. The package, folded into shape from a single corrugated blank, includes a spout for pouring nails, Each time it is used, the package can be tightly closed to preserve its contents from moisture and rusting.

* * *

The development of a magnetic device by a major machinery manufacturer completes the system. During the packing process, a conveyor automatically collects and weighs 50 pound of nails with uncanny accuracy. As they fall down a chute they are aligned horizontally by powerful electromagnets. Polarity is then reversed and nails fall ranked rather than

helter-skelter into the new package. The magnetic machinery was developed by **The Drake Corporation,** Grand Haven, Mich.

* * *

This system eliminates the use of a vibrator which was commonly used to shake down the conventional tangle of nails to make them fit into a container. Formerly it often took 13 minutes to accomplish this task, and the tremendous noise of the operation impaired efficiency of employees who worked nearby.

* * *

For more complete details, write The Mead Corp., New Products Div., 4400 Marburg Ave., Cincinnati, Ohio.

Allegheny Ludlum Plans Overseas Affiliate

Plans for the formation of a major new stainless and special steel company in Western Europe were announced jointly today by **Allegheny Ludlum Steel Corporation,** Pittsburgh, and the Belgian firms, **Evence Coppee & Cie,** Brussels, and **Societe Anonyme Metallurgique d'Esperance-Longdoz,** Liege.

* * *

E. J. Hanley, President of Allegheny Ludlum, stated that Allegheny Ludlum will have equal ownership with the Belgians. An announcement was made simultaneously in Belgium by the Coppee-Longdoz group. The new company will produce and sell stainless and special steels in European and world markets.

* * *

The plant will involve a capital investment in excess of $10 million. It will have cold-rolling and finish ing facilities for supplying flat-rolled stainless and special steel products. Production is expected to begin in 1962.

Chase Fasteners Catalog

A new, 28-page fasteners catalog is available from **Chase Brass & Copper Co.,** a subsidiary of Kennecott Copper Corp. The catalog lists a complete line of bolts and nuts, cap and machine screws,

Établissements

VICTOR LINÉ

of Albert (Somme) France

Originators Of The Famous LINÉ-GORCY Rod Descalers

(Over 2000 now operating in 28 countries of the world)

Proudly Announce Their

NEW DC-1-A & DC-2-A

MECHANICAL ROD *DESCALERS*

For Cleaning Hot Rolled Wire Rods up to 5/8-inch Diameter incl.

New Features —

Lubrication of *Bearings*—permanent—sealed

Increased efficiency—Motor driven brushes

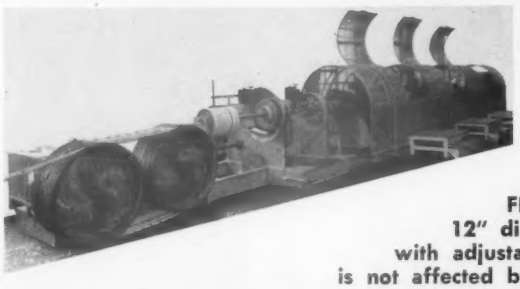
Newly designed hard-faced *Roller* units

Easier *Threading* and easier *Maintenance*

With these Superior Machines
MECHANICAL DESCALING of WIRE RODS
—Takes a Giant Step Forward

Write to: **FISHER ASSOCIATES** 122 E. 42nd St., New York 17, N. Y.

4-Wire Twisting Machine



CRADLE REELS
Diameter: 48"
Overall Width: 31½"

FILLER HEAD 24 Packages 12" diameter by 12" Traverse with adjustable tension control that is not affected by loading or unloading.

SERVING HEAD AIMCO plate type flyer with six spindles accommodating yarn packages 6" diameter 4" traverse.

BINDING HEAD AIMCO plate type flyer with two spindles accommodating yarn packages 3" diameter 5" traverse.

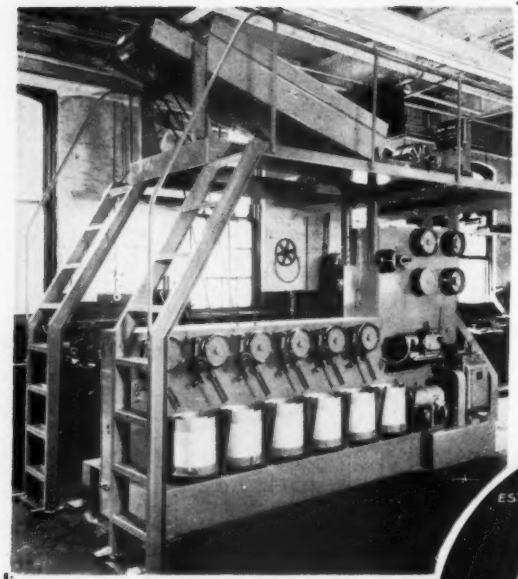
Either type is driven thru clutch, variable speed device and Gilmer belts from the constant speed shaft.

TAPING HEAD is of the constant tension type and accommodates a pad 24" in diameter and up to 4" in width. It is driven thru clutch, variable speed device and Gilmer belts from the constant speed shaft.

CAPSTANS 6 groove 42" root diameter. Rates of lay from 3" to 50". Flyer speed 8 steps from 600 to 34 R.P.M. Handles large diameter wires on cradle reels.

An exceedingly efficient and versatile machine.

THE EDMANDS CO. 860 WELLINGTON AVE. CRANSTON 10, R. I.



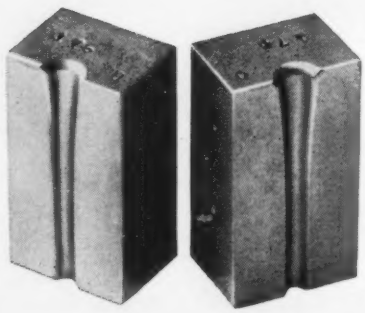
Left: Barrel Take-up No. 1237, B&S Gauge 20 to 30, for enameling machine with pre-annealer.

SPOOLING EQUIPMENT
TAKE-UPS & PAY-OFFS
TAPING MACHINES
PANNING MACHINES

EST. 1855 ALMCO INC. 1915
"American" INSULATING MACHINERY COMPANY
TRADE MARK
FAIRHILL AND HUNTINGDON STREETS
PHILADELPHIA 33 PENNSYLVANIA U.S.A.
MANUFACTURERS OF WIRE INSULATING MACHINERY AND ALLIED EQUIPMENT. MACHINERY MFG. TO CUSTOMERS SPECIFICATIONS.

Sjogren POINTING DIES

SJOGREN Pointing Dies have proven themselves! Made from shock-resisting high grade steel they assure many hours of hard, continuous usage. Fit your swaging machines with these rugged, S & S Pointing Dies, made to order on your specifications, they guarantee you service.



SINCE S&S 1927

Used by Wire Men Who Want the Best!

Sjogren SINCE S&S 1927 TOOL & MACHINE CO., INC.

WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • CAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

14 Sword St.
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washers, cotter pins, nails and tacks, escutcheon pins, rivets, etc.

* * *

Most of the Chase fasteners are available in Silnic Bronze as well as other commonly used alloys.

* * *

Chase Silnic Bronze is a Nickel Silicon heat treatable alloy that, when heat treated, gives physical properties far superior to most other non-ferrous alloys, particularly as to proof load, the maximum load that can be exerted on a bolt without the hazard of permanent stretching or elongation.

* * *

Copies of the new Chase fasteners catalog CK-17 are available upon request from any Chase warehouse or sales office; or directly from Chase Brass & Copper Co., Waterbury, 20, Conn.

Materials in Nuclear Applications

This book has been published by the **American Society for Testing Materials** on the nuclear energy field. It includes the papers presented at three symposia: "Radiation Effects and Dosimetry," "Post-irradiation Effects in Polymers," and "Ceramics in Nuclear Energy."

* * *

The Symposium on Radiation Effects and Dosimetry has a two-fold objective: (1) to clarify some of the confusion existing in the field of radiation dosimetry, and (2) to summarize some of the latest data pertaining to the effects of radiation on various materials. A series of seven papers on radiation dosimetry covers the field in a broad manner.

* * *

The Symposium on Postirradiation Effects in Polymers contains four papers describing the existence of long-lived, chemically active, free radicals in irradiated polymers. One paper describes some of the recent techniques for studying the identity, concentration, and lifetime of these species. The other three deal with actual postirradiation changes in physical and chemical properties of a few selected polymer systems.

* * *

The Symposium on Ceramics in Nuclear Energy has three general

objectives: (1) to promote a better understanding of the wide area in which ceramic materials are used in nuclear reactors, (2) to provide leadership for a discussion forum so that theoretical premises as well as experimental data could be reviewed, promoting a better understanding of individual problems, and (3) through discussion, to formulate areas of agreement and disagreement, and thus to find common ground for the development of standards, and highlight areas requiring additional study.

* * *

Also included in the volume are two papers presented at the Symposium on Technical Developments in the Handling and Utilization of Water and Industrial Water. One describes the system for disposal of radioactive waste waters at the Hanford Operation, the other outlines methods for the determination of radioactive materials in water.

* * *

Copies of the book may be obtained from ASTM Headquarters, 1916 Race St., Philadelphia 3, Pa. at $8.25 each.

First Commercial Gold Recovery Unit

The first commercial unit for recovering gold lost in electroplating was introduced on Oct. 19 by **Technic, Inc.,** one of the largest producers of precious metal solutions for plating.

* * *

Until now between 4 and 10 per cent of all gold used in electroplating has simply gone down the drain, said **Frank K. Smith,** president of the firm and the loss to the plating industry runs to millions of dollars a year.

* * *

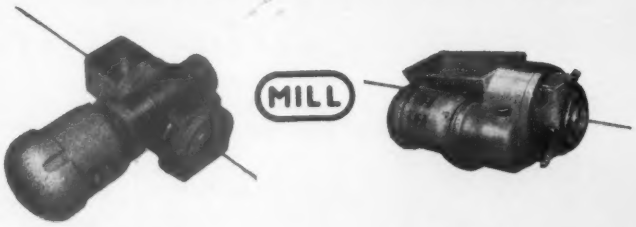
One electroplater, using the new special resin Gold Saver on a trial basis, recovered enough gold in less than three months to pay for the unit; from now on the savings will be "found money." Full details may be secured from Technic, Inc., P.O. Box 965, Providence, R. I.

Tachometer Catalog

The new **Jones Motrola Corporation** Catalog is of interest to

ROTATING DIE-HOLDER

for a perfectly round wire and improved die life



Type FR43
for max. outside dia. of die 1 11/16"

Type FR53
for max. outside dia. of die 3 5/32"

SOCIETA GENERALE DELLE MACCHINE MILL
Via Monti, 9 - MILANO - Italia

WIRE DRAWING MACHINES AND FIXTURES

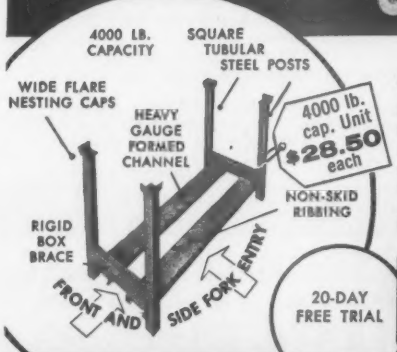
General Catalogue on application

Belgium: R. Dahinden S. A., rue A. Dansaert 123, Bruxelles 1.
France: Soc. Bewe, 66, rue Saint-Sabin, Paris 11
Great Britain: Stanton Machine Tools Ltd., West Molesey, Surrey.
Japan: Asia Industry, Saiwai Bdg, Uchisaiwacho, Chiyodaku, Tokyo.
South Africa: Atlanta Ltd., P.O. Box 8347, Johannesburg
Spain: Semill, apartado 419, San Sebastian.
Sweden: S. Bergstrom & Co., Post Box 47039, Goteborg, 47.
U. S. A.: Standard Industrial Compounds Co., Frankfort, Illinois.

other countries representatives are needed

JARKE
PORTABLE
WIRE COIL RACKS

COURTESY HOLO-KROME SCREW CORP.



Solve Wire Coil Storage Problems

Makes handling and storing of unwieldy wire coils a simple one-man operation. Improves plant housekeeping, saves space, provides positive inventory control. Front and side fork entry permits closer stacking and greater maneuverability in narrow aisles. Saves time, labor, cuts costs. Standard and special sizes.

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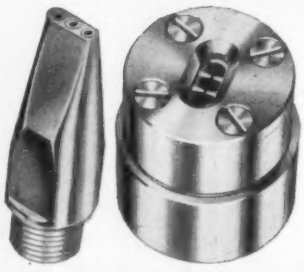
MODULAR STORAGE SYSTEMS FOR METAL INDUSTRY • STEELMOBILE

INSULATING DIES AND NOZZLES

for

EXTRA-HIGH ELECTRIC WIRE PRODUCTION



CARBIDE EXTRUSION NOZZLES OR TIPS FOR ALL MACHINES.

CARBIDE AND STEEL

Highest quality of workmanship and materials. Standard Types and Special Dies and Tips to your order.

CENTRAL CARBIDE NOZZLES have phenomenally long life; will lower operating costs and reduce wire breakage.

CENTRAL STEEL DIES are made in Round, Figure 8, Serrated, Tracer, and other special shapes to your specifications.

A newly designed Tru-Rip Die Assembly can be taken apart, cleaned, blades changed, and the whole reassembled easily and quickly. Made for 2 and 3 conductor wires to be coated in extrusion machines.

Write for folder or phone for information

WIRE TOOL DIVISION

CENTRAL TOOL AND MACHINE CO.

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Export Dept. ANDOVER INTERNATIONAL INC., P.O. Box 29, Bayside 61, N. Y.

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LEADER IN HIGH PRODUCTION EXTRUSION TOOLS FOR ELECTRIC WIRE

EQUIPMENT

Extruders
Takeup Equipment
Payoff Equipment
Spoolers
Respoolers
Measuring Machines
Capstans
Cable Strippers
Braiding Equipment
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Spark Testers
Printing Machines
Spiral Striping Machinery
Taping Equipment
Fine Wire Takeup and Respooling Equipment
Wire Drawing Machines
Specially Built Equipment
And Much More

SUPPLIES

Wire Drawing Dies
Wire Drawing Spools
All Types of Reels and Spools
Lithographed Spools
Inks for Printing Machines
Bare, Tinned and Silver Plated Copper Wire, Stainless Steel, Silver, Nickel, Bronze, Brass and Other Bare Wires
Numerous Other Items

all the wire industry in the West looks to 2 companies

First, there's Western Wire & Textile Machinery, Inc., the only company in the West that deals exclusively in used and reconditioned wire and cable-making equipment.

Secondly, there's the Paul I. Kenner Co., supplier and distributor of new wire and cable manufacturing machinery and supplies.

Nowhere else in the West will you have a better chance of finding exactly what you need---either new or used. Nowhere else in the West will you be able to trade in old equipment on new. Nowhere in the West will you find such a complete stock of machinery and equipment.

You'll like dealing with men who speak your business language---with companies backed by 20 years of highly specialized experience.

SOME EQUIPMENT ON HAND:

Takeups • Payoffs • Braiders • Asbestos Carding Lines • Taping Machines • 7 Stranders, 1 for 6 x 4 inch spools, 1 for 16 x 9 inch reels • New England Butt 24" buncher.

2 Two companies that provide all that's needed, new and used for the West's wire industry.

WESTERN WIRE & TEXTILE MACHINERY, INC.

228 Shaw Road South San Francisco, Calif. Tel.: JUno 9-1101

PAUL I. KENNER CO.

228 Shaw Road South San Francisco, Calif. Tel.: JUno 9-1101

anyone having problems of speed measurement, production control, or quality control.

* * *

It contains photographs and drawings and descriptions of 19 distinct types of Jones Tachometers, together with drawings of various types of flexible shafts and drives and drawings of various drive arrangements.

* * *

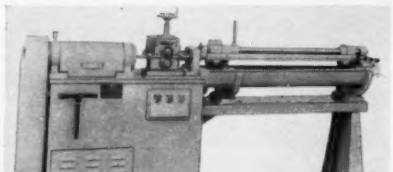
A copy of Catalog 62 will be sent to anyone addressing their request to: Jones Motrola Corp., 432 Fairfield Ave., Stamford, Conn.

New Shuster S&C Machine

The new Shuster 1V18 Variable Speed Automatic Wire Straightening and Cutting Machine is announced by **Mettler Machine Tool Inc.**, Boulevard Industrial Park, New Haven 4, Conn., for wire ranging in diameter from 1/16 to 1/8 inch.

* * *

Features include high speed straightening arbor, with five



elongated split-dies, mounted on ball bearings; Reeves variable speed unit for infinite feed ranges from 25 to 150 f.p.m.; feed roll housing with shafts mounted on Timken bearings; angled electric control panel for one-position operation; Micro Switch trips new improved target with positive setting and positive release; Solenoid operated roll-type clutch; drive shaft mounted on ball bearings; fly wheel on roller bearings. These new models are arranged for high speed cutting — 200 cuts per minute, up to 8".

* * *

These machines are manufactured in 2 standard models, which includes a model that is constant speed machine geared to feed up to 125 f.p.m.; both models are especially designed for adaptation

to shaped stock. The latter machines are supplied with the Shuster 12 roll central foot shaped stock straightening unit in place of a rotary arbor.

* * *

Mettler Machine Tool also manufactures machines of this type for special applications, such as special speeds and capacities for heat treating, with feeds for press operations, etc. There are 51 Shuster models of wire straightening components and straightening and cutting machines from .020″ to 11/16″ capacities, as well as 4 models of the Shuster 5/16″ cold thread rolling machine.

Modern Developments in the Control of High Speed, Low-Tension Reeling Equipment

(*Continued from page* 1667)

erator to jog the balance of wire left on the pay-off reel slowly until only a few feet are left on the reel and then to replace the empty reel with a full one, join the two ends together and jog the wire through the dancer and the Electrode Unit until the joint has reached the take-up reel. This eliminates the necessity of the operator threading-up the dancer and Electrode every time he changes a reel. If desired, instead of stopping the Reeler, the photo-electric control can be made to automatically reduce the full running speed of 2000-ft/min. to a reduced run-out speed of say 500-ft/min. and to allow the remainder of wire on the pay-off reel to finish out at this lower speed.

* * *

In all re-reeling applications as described above, we use the photo-electric control on the Pay-off and the stepper-acceleration control on the Take-up.

* * *

There are additional applications, other than re-reeling, where these controls, or modifications of them, used separately, are ideal for the control jobs to be accomplished.

* * *

One instance of this is the case of the very small-wire Preheater mentioned above. Here an eddy-current-clutch motor was used to

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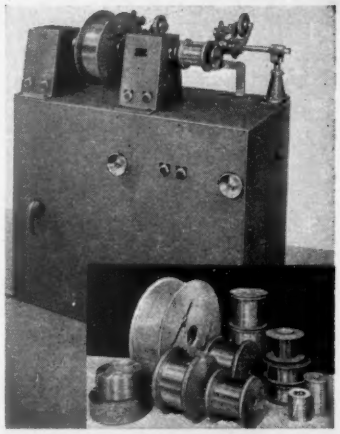

The New Model 1900-HVE Multi-Spindle Spooler (up to 16 Heads), engineered to include a variable speed system for adjustment of spindle speed, pitch, and traverse. This complete flexibility of adjustment makes a very uniform layer wound package which prevents binding and kinking during pay-off.

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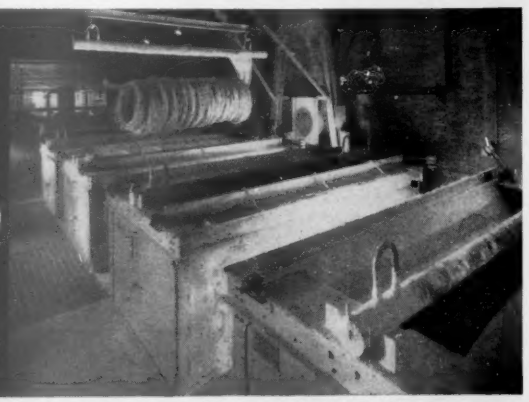

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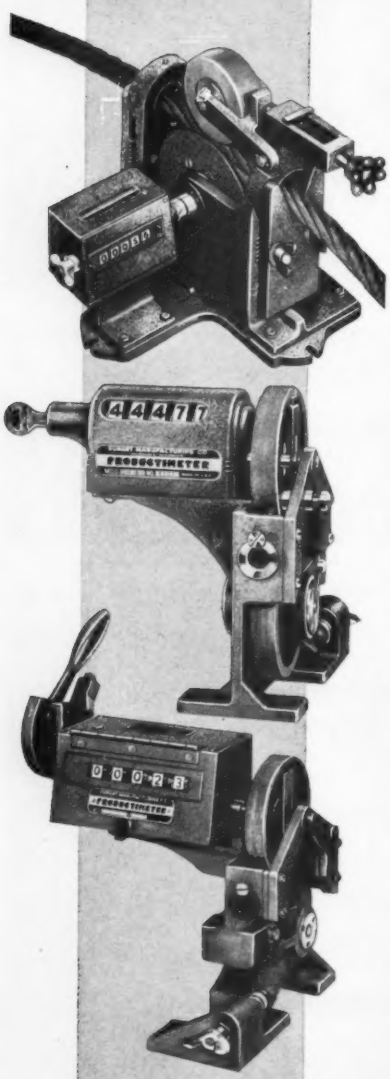

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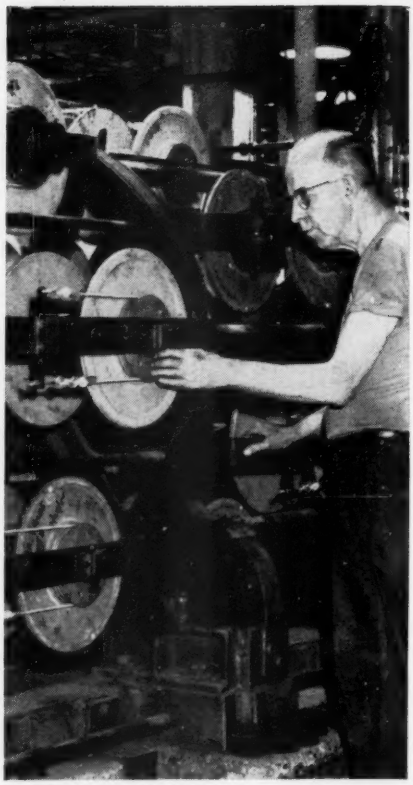
drive the Preheater and an oven-enclosed dancer with photo-electric control was used to synchronize the Preheater drive with the Extruder.

* * *

Another requirement which is being solved very satisfactorily with the new dancer control is the high-speed, tension-controlled take-up of small wire from wire-drawing machines onto reels instead of into coils. Modern wire drawing-machines have high starting acceleration rates, and a Reeler must be capable of exerting sufficient torque to accelerate the take-up reel in synchronism with the wire drawing machine during acceleration, and then to exert only winding torque after the machine has reached constant running speed. This range of torque can be considerable when it is realized that the necessity for acceleration ranges from an empty take-up reel to an almost full one, which, by the way, weighs almost a thousand pounds in one of our installations. When a wire break occurs with the take-up reel almost full, the wire ends are butt-welded or brazed together and the wire drawing operation resumed. Then the heavy, almost full reel has to be accelerated in about the same time as an empty one would have to be. The torque required to do this is usually far in excess of the breaking strength of small wire and the operation could not be satisfactorily accomplished without the dancer and its precise control.

* * *

The new stepper-acceleration control very satisfactorily solves the old problem of automatically accelerating machines from standstill to running speeds where the operations to be performed will simply not permit the motors to be thrown across the line. This new control system allows simple, inexpensive and precise selection and control of rate of acceleration, initial acceleration torque and shape of acceleration curve from standstill to any one of a number of running speeds. It permits automatic push-button operation of almost any difficult starting problem.



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MF-11-4-60-WWP

Vertical and Horizontal Continuous Vulcanizing

(*Continued from page* 1656)

no real limit to the size that can be done easily on this machine. It is especially well suited for the heavy wall butyl work where sagging of the butyl to an eccentric or out-of-round formation is always a hazard on anything except the straight Vertical line.

* * *

Production capabilities of the Vertical CV line should be considered in their proper perspective. Of course, the actual feet per minute of running speed is directly proportionate to the length of the tube, assuming a given steam pressure. Typical installations thus far have vertical tube lengths varying all the way from 40 feet on some of the earliest lines up to 100 feet on the highest installations. The average has probably been in the neighborhood of 70 feet of length. Thus comparing this with a Horizontal of twice that length which you may now have in operation, you could plan on approximately half the feet per minute rate. A specific speed is difficult to give due to the different materials, degrees of acceleration, requirements for pressure cooling, steam pressures, cable constructions, etc. A rule of thumb which seems to be reasonably valid for heavy wall butyl insulation in the 27/64th wall thickness range on circular mil sizes, is that the cable must be in the 250 psi steam for 8 minutes to cure properly. This, of course, would translate into 9 FPM using a 72 ft. steam tube length.

* * *

There are several other most important points to be considered, however, in evaluating the productive potential of a Vertical CV. First, you can depend upon being able to run at the full curing speed without regard to contacting the tube prematurely. Running big cables other than vertically, you may find many times that you must run below the calculated speed to prevent damage to the insulation. In such cases the added length you think you have is actually ineffective in its purpose.

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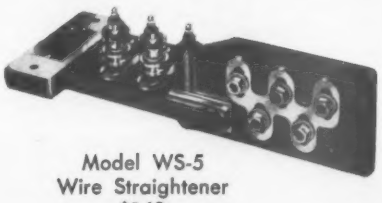

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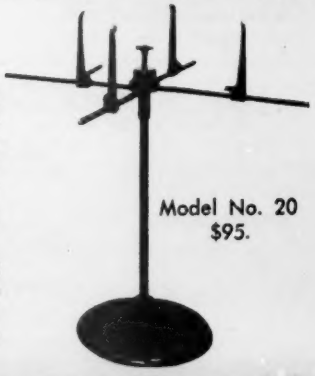

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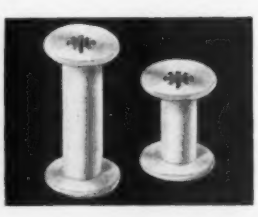

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Secondly, we should look carefully at the intended purpose of the line. A Vertical CV is a specialized machine engineered primarily for most efficient operation on large, expensive cable constructions. In all cases the Vertical CV has been installed to supplement the Horizontal CV plant facility, not to replace it. It competes very favorably with costly operations such as curing in lead, even at relatively slow speeds in feet per minute. It is normally working with expensive cables where a final quality product is the prime consideration, rather than speed. The scrap factor is of vital concern when several dollars per foot are involved. No one can be certain of the final product quality until it emerges from the seal and thus moderate tube lengths have their advantages.

* * *

Finally, the total production is not measured only by feet per minute. What really counts is the dollar volume processed of saleable product at the end of a given period. Such factors as ease of start up, total down time, amount of scrap, etc., all must be weighed with the running speed to properly evaluate productivity of the equipment. Quality is sometimes difficult to rate properly, but we believe our Vertical CV has earned an enviable reputation for producing a fine product with uniform diameter, good concentricity, dense insulation, and smooth finish.

* * *

As far as the cost of a Vertical installation, it does require a penthouse or a tower of some kind. It only has to be large enough to house the extruder-metering capstan unit, but naturally this means some initial expense, unless someone is fortunate enough to already have a multiple story building of sufficient height. In relation to the overall project installation, however, this cost is not prohibitive. In proper prospective this cost should actually be compared with other forms of building expansion to increase plant facility. A Horizontal CV requires floor space, which is money. A Vertical CV saves considerable floor space compared with the Horizontal, and this

saving should be deducted from the tower cost when comparing the alternate systems.

* * *

The overriding consideration, however, in our analysis always gets back to the one fundamental principle that the Vertical CV is the right way to continuously vulcanize large cable. From both a theoretical view and a practical mechanical view the Vertical is correct and has proven itself successful in many cable plants around the world.

Wire Kinks

(*Continued from page* 1681)

reduces most oxides and those that are not sufficiently reduced to make the metal surface satisfactory for further processing.

* * *

Chemically, the reaction for one class of oxides, such as magnetite, may be expressed in the equation:

$$Fe_3O_4+4NaH = 3\ Fe+4\ NaOH$$

* * *

Operating temperatures are held at from 660°F to 760°F. The bath contains about 98% of fused caustic soda, which is commercially available as Na_2O in flake or solid form, the type depending on the equipment employed to heat the descaling pot. This melts at 605°F -608°F and the bath normally is heated to approximately 700°F.

* * *

When the scale is reduced, the work is removed from the bath, drained, and immersed while hot in water. This is followed by high pressure spray or rinse to remove residual caustic soda and loosely adhering scale.

* * *

Should the material have contaminants such as grease, oils or dirt in any amount, prior to descaling these should be removed by solvent degreasing or aqueous alkaline cleaning.

* * *

Hydrogen for the reaction is supplied by an ammonia dissociating unit or any dry gas mixture containing hydrogen that is free from oxygen, CO and CO_2.

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Cold Heading and Cold Extrusion of Wire

(*Continued from page* 1652)

Fig. 11 shows the sequence of operations in the manufacturing of a 1″ heavy hex head bolt. The first

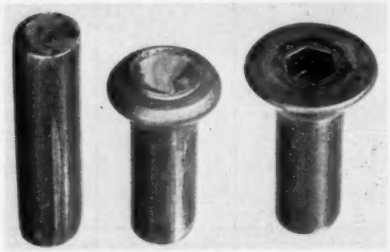


Fig. 10 — 5/8 in. Flat Head Socket Screw. * *

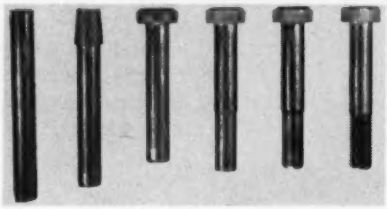


Fig. 11. — 1 in. Heavy Hex Head Bolt. * *

four steps involve: cutoff, coning, upset, extrusion and trimming and are performed in a progressive header. Pointing and threading operations are performed in separate machines.

* * *

Fig. 12 shows the sequence of op-

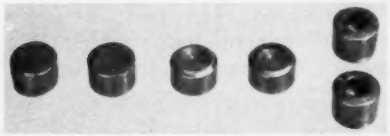


Fig. 12. — 3/8 in. Pipe Plug. * * * *

erations in forming a pipe plug in a nut forming machine. The cutoff stock is progressively upset prior to the backward extrusion of a square or hexagonal socket.

* * *

Fig. 13 shows the steps in form-

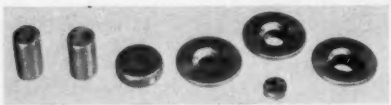
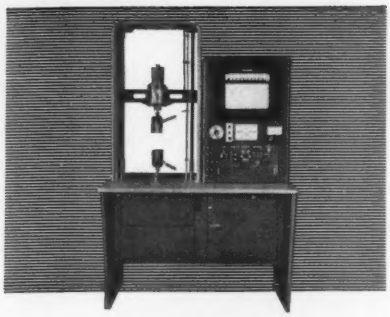


Fig. 13. — Valve Spring Retainer. * *

ing a valve spring retainer. 1008 aluminum killed wire is progressively upset and extruded, pierced and tapered to complete the part.



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Sintered Tungsten Carbide Dies in the Wire Industry

(*Continued from page* 1670)

quality of their wire has been improved especially in maintaining size and out-of-round tolerances to the point where these factors are no longer a problem.

* * *

They have also found that there is no evidence of marking on the wire due to the revolving dies. As a matter of fact, the difficulty some times experienced due to scored wire was completely eliminated after they started rotating the dies.

* * *

Westinghouse uses a revolving die turning at about 60 R.P.M. They have made no changes in lubrication, continuing to use bright wire grease and descaled wire for drawing from 5 gauge to 3/32" diameter.

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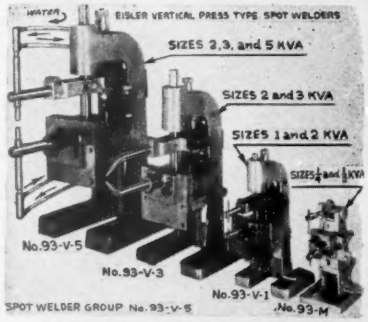

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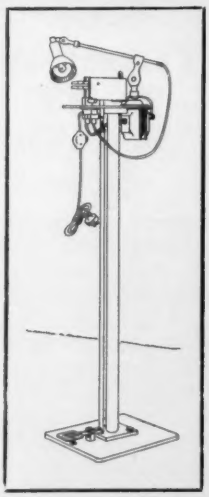

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* * *

Approximately 220 persons attended, the response to the announcement exceeding all expectations. With **A. J. Michaels** of Bridgeport Gas presiding, papers on the following subject were presented: "Factors that Affect the Selection of Metal Treating Equipment", "Natural Gas and Its Evolution in the Specialty Steel Industry", "Gas Atmosphere Generators", "Space Age Materials for the 60's", "Practical Problems of Heat Treating", and "Oven Applications."

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The high-light of the meeting was an after-luncheon address by **Herman W. Steinkraus,** Chairman of the Board of The Bridgeport Brass Company, who spoke on the question of foreign competition and its effect on domestic business and jobs and its future effect on our economy if remedial steps are not taken.

* * *

After the last paper a Friendship Hour concluded the highly successful, informative and interesting session.

Wire Temperature Meter

To measure the temperature of wire to see that it does not rise to a point where the physical properties of the wire or the lubrication are impaired, a wire temperature meter has been developed for process control in wire mills.

* * *

The makers state that in high speed wire drawing these measurements are essential to efficient production. The instrument has been found useful also in measuring wire temperatures during heat treatment and in "in-line" cleaning and coating.

* * *

The instrument has a speed range of 50-3000 fpm and a temperature range of 50-500°C and is made to handle wires of 9-16 S.W.G. with an accuracy of plus or minus 5°C. It is manufactured by the **Addison Electric Co. Ltd.,** England, who are represented here by **Muirhead Instruments, Inc.,** 441 Lexington Ave., New York 17, N. Y.

Brochure on Welding Awards Program

The James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio, has issued a brochure describing a competition for welded designs of machines or structures.

* * *

A total of $25,000.00 will be paid, spread over 76 awards, the top award in each class being $3,000.00 and the minimum being $100.00, of which there are 38.

* * *

The contest closes on July 17,

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1961, by which time all papers must have been mailed. Details on the award program are contained in the brochure.

Bulletin on Furnaces

Sunbeam Equipment Co., 186 Mercer St., Meadville, Pa., has issued a four-page folder picturing and describing "New Furnaces for the 60's". These include gas, electric and oil fired batch, continuous, shuffle hearth, etc., furnaces made by the company. Copies of the bulletin, No. 3, Vol. 19, are available upon request to the company.

Bulletin on Component Parts

Stanley Humason, Inc., Forestville, Conn., a subsidiary of The Stanley Works, has issued a bulletin on its custom-manufacturing services for the electrical and electronics industries.

* * *

In addition to such products the company has engaged over a long period of years in the manufacture of precision coil and flat springs, screw machine products, wire forms, light stampings, special fasteners and assemblies, working in all of the more common ferrous and non-ferrous metals and alloys.

* * *

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New Length Standard Adopted

On October 14, 1960, the world adopted a new standard of length — a wavelength of light — replacing the meter bar that has served as the standard for more than 70 years.

* * *

The action was taken by the 11th General Conference on Weights and Measures in Paris and announced here by the National Bureau of Standards, U. S. Department of Commerce.

* * *

The new standard of the meter is 1,650,763.73 wavelengths of the orange-red line of Krypton 86 light. It replaces the platinum-irid-

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ium meter bar that has been kept in Paris as the international standard since 1889 under the Treaty of the Meter. The action is considered of importance to those in science and industry who are engaged in precision measurements.

Modern Wire Moves

The Modern Wire Company has announced the removal of its offices, factory and warehouse to new and larger quarters at 35-11 Ninth St., Long Island City 6, N. Y. The move also involves a new telephone number: RAvenswood 8-0909.

Bostitch to Build Modern Wire Mill in Connecticut

The purchase of 41 acres of land in Clinton, Conn., on which a modern wire mill will be built for **Universal Wire Company**, subsidiary of **Bostitch, Inc.**, has been announced by **Emmet G. Gardner**, president.

* * *

The new plant, which will be a structure of approximately 100,000

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Phone HARRISON 1367

square feet and accommodate up to 100 employees, will produce a substantial part of the Bostitch requirements of stapling wire and attaching wire. At normal production rates Bostitch, Inc., consumes approximately 30 tons of wire a day in the manufacture of staples alone.

* * *

According to Mr. Gardner, construction of the new plant will be started before the end of this year. Universal Wire Company is presently located in Stamford, Conn.

New Polyethylene Bonding Agents

The Technical Service Department of **Mereco Products Division** has prepared a new brochure, TSB-3-625-1060, entitled "Preparation of Polyethylene Surfaces For Bonding." This bulletin describes a new method developed for rendering polyethylene surfaces bondable with Mereco's epoxy adhesives, Meta-Bond 301 and Meta-Bond 303. The new method should be of interest in encapsulation of electronic components and applications where bondable teflon was formerly utilized.

* * *

Interested individuals may obtain copies by writing the Technical Service Department on company letterhead to Mereco Products

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Catalytic Combustion Corp. Joins Universal Oil

Catalytic Combustion Corporation, of Detroit, Mich., has announced that, through mutual exchange of stock, they have become a fully owned subsidiary of Universal Oil Products Company of Des Plaines, Illinois.

* * *

Universal Oil Products is a recognized leader in the fields of petroleum refining and petrochemical research and technology; UOP Platforming, Fluid Catalytic Cracking, Hydroforming, and other catalytic processes are licensed for use by refiners throughout the world. Now, by combining Catalytic Combustion Corporation's developments — all-metal catalysts, catalytic fume combustion, heat and power recovery, process gas purification, and catalytic infrared generation — the widest possible range of catalyst applications are brought under one corporate structure.

* * *

Catalytic Combustion Corporation will continue to operate from its Detroit offices, with fabrication facilities in Bloomer, Wisc. Industrial sales will be maintained through its established agents. Active officers of the company will remain unchanged.

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The Wire Man's Magazine

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Hyprez Div., Engis Equipment Co., Chicago, Ill.
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation, Mishawaka, Ind.

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Wheelabrator Corporation, Mishawaka, Ind.

ACID INHIBITORS—
(See Inhibitors, Pickling)

ANNEALING MACHINES — Electric Resistance
Syncro Machine Co., Perth Amboy, N. J.

ANNEALING POTS AND BOXES—
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.

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(See OVENS—Rod Bakers)

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Apco Mossberg Co., Attleboro, Mass.
Molded Fiber Glass Tray Co., Linesville, Pa.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Plastic Mold & Engineering Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

BORAX—Wire Drawing
U. S. Borax, New York, N. Y.

CABLE FILLERS—Paper
Ludlow Papers, Needham Heights, Mass.
Plymouth Cordage Company, Plymkraft Division, Plymouth, Mass.
Twitchell, Inc., E. W., Philadelphia, Pa.

CAPSTANS—for Wire (also Caterpiller Types)
Bartell Machine Tool Corp., Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Div. of Franklin Research and Development Corp., Mystic, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
General Engineering Company (Radcliffe) Limited, Radcliffe, England
Larmuth & Bulmer Limited, Manchester, England

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

CASTINGS—Wire Mill
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

CEMENTS—Refractory
Amchem Products, Inc., Ambler, Pa.

CLEANERS—Metal
Apex Alkali Products Co., Phila., Pa.
Magnuson Products Corporation, Brooklyn, N. Y.
Miller, R. H., Co., Inc., Homer, N. Y.
Parkin Chemical Co., The, Pittsburgh, Pa.
Standard Industrial Compounds Co., Frankfort, Ill.

CLEANING & PICKLING EQUIP.—
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, Ohio
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Wheelabrator Corporation, Mishawaka, Ind.
Wilson, Lee, Engr. Co., Cleveland, Ohio

CLOTH—WIRE, All Metals
Hudson Wire Co., Pequot Div., Norwalk, Conn.
Wickwire Bros., Cortland, N. Y.
Wisconsin Wire Works, Appleton, Wis.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corp., Brooklyn, N. Y.
Miller, R. H., Co., Homer, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.
U. S. Borax, New York, N. Y.

COLOR CONCENTRATES—For Wire Coatings
Blane Corporation, The, Canton, Mass.

COMPOUNDS—Coppering
Amchem Products, Inc., Ambler, Pa.
Miller, R. H. Co., Inc., Homer, N. Y.

COMPOUNDS—Diamond (Pre-Mixed)
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

COMPOUNDS—Extrusion, for Wire
Amchem Products, Inc., Ambler, Pa.
Blane Corporation, The, Canton, Mass.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
U. S. Industrial Chemicals Company, Division of National Distillers & Chemical Corporation, New York, N. Y.

COMPOUNDS—For Improving Drawing & Extrusion
Amchem Products, Inc., Ambler, Pa.

COMPOUNDS—Metal Finishing
Amchem Products Inc., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Phosphate Coating
Amchem Products, Inc., Ambler, Pa.

COMPOUNDS—Rust Preventing
Amchem Products, Inc., Ambler, Pa.
American Lanolin Corp., Lawrence, Mass.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Rust Removing
Amchem Products, Inc., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corp., Brooklyn, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.

COMPOUNDS—Vinyl
Blane Corporation, The, Canton, Mass.
Escambia Chemical Corp., New York, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Union Carbide Plastics Company, Div. of Union Carbide Corporation, New York, N. Y.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corp., Brooklyn, N. Y.
Miller, R. H. Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.
Swift & Company, Chicago, Ill.
U. S. Borax, New York, N. Y.

CONDUCTORS—Flexible, Electrical
Hudson Wire Co., Ossining, N. Y.
Montgomery Co., The, Windsor Locks, Conn.

CONTAINERS—Wire Packaging
(See DRUMS—Wire Packaging)

COPHOLDERS—Steel
Apco Mosberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

COUNTERS—
(See MACHINERY—Measuring Wire and Cable)

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, Ohio

CUTTING TOOLS—Carbide
Eastern Carbide Corp., New Rochelle, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.

CUTTING TOOLS—Wire
Manco Mfg. Co., Bradley, Ill.
Robinson, M. W. Co., Rockville, Conn.

DIAMONDS—Industrial
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y
Wayne Wire Die Co., Linden, N. J.

DIAMOND POWDERS—
Alabama Wire Die Co., Fayette, Ala.
Danforth Company, C.W., Youngstown, Ohio
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Fort Wayne Diamond Products, Inc., Fort Wayne, Indiana
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIAMOND POWDER RECLAIMING—
Danforth Company, C.W., Youngstown, Ohio
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Fort Wayne Diamond Products, Inc., Fort Wayne, Indiana
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Alabama Wire Die Co., Fayette, Ala.
Indiana Wire Die Co., Ft. Wayne, Ind.
Wayne Wire Die Co., Linden, N. J.

DIES—Carbide, Tungsten & Tantalum
Alabama Wire Die Co., Fayette, Ala.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rivom, Dijon, France
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIES—Cold Heading
Alabama Wire Die Co., Fayette, Ala.
Eastern Carbide Corp., New Rochelle, N. Y.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rivom, Dijon, France

DIES—Diamond
Ajax Industrial Supplies, Inc., Ft. Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J. Inc., New York, N. Y.
Brenon, Inc., Nixon, N. J.
Ft. Wayne Wire Die Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
National Wire Die Co., Inc., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Roux Wire Die Works, Inc., Oriskany, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIES DIAMOND—Controlled Drawing Angle
Hoosier Wire Die, Inc., Fort Wayne, Ind.

DIES DIAMOND—Reversible
Alabama Wire Die Co., Fayette, Ala.
Indiana Wire Die Co., Fort Wayne, Ind.
National Wire Die Co., Inc., New York, N. Y.

DIES—Extrusion
Central Tool and Machine Co., Bridgeport, Conn.
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rivom, Dijon, France.
Rusch Wire Die Corp., Croton-on-Hudson, N.Y.
Wayne Wire Die Co., Linden, N. J.

DIES—Eyelet
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.

DIES—Nail, Nail Cutters, Feeder Blocks, Grippers, etc.
Pittsburgh Carbide Die Co., Monongahela, Pa.

DIES—Pointing
Sjogren Tool & Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Alabama Wire Die Co., Fayette, Ala.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Brenon, Inc., Nixon, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
National Wire Die Co., Inc., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Roux Wire Die Works, Inc., Oriskany, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIES—Roll Threading
Rivom, Dijon, France

DIES—Special Shapes, Etc.
Alabama Wire Die Co., Fayette, Ala.
Eastern Carbide Corp., New Rochelle, N. Y.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Rivom, Dijon, France

DIES—Swaging
Sjogren Tool & Mach. Co., Inc., Auburn, Mass.

DIES—Tinning
Roux Wire Die Works, Inc., Oriskany, N. Y.

DIES—Tube Drawing
Alabama Wire Die Co., Fayette, Ala.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rivom, Dijon, France
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRIVES—Variable Speed
Allis Co., Louis, Milwaukee, Wisc.

DRUMS—Wire Packaging
Hubbard Spool Company, Div., Van Norman Industries, Inc., Garrett, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

DRUMS & TRAVERSES—For Cable Reels
Hubbard Spool Company, Div., Van Norman Industries, Inc., Garrett, Ind.
Republic Steel Corp., Berger Div., Canton, Ohio

DRYING EQUIPMENT—
Carl Mayer Corp., The, Cleveland, Ohio
Michigan Oven Company, Detroit, Mich.

DUST COLLECTORS—Wet or Dry
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation, Mishawaka, Ind.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FOAM PRODUCING COMPOUNDS—
Amchem Products, Inc., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Brazing
Ajax Electric Company, Philadelphia, Pa.

FURNACES—Galvanizing Equipment
Ofenbau Fritz, G.m.b.H. & Co., K. G., Hagen, (W. Germany)
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Heat Treating
Ajax Electric Company, Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Ofenbau Fritz, G.m.b.H. & Co., K. G., Hagen, (W. Germany)
Wilson Lee Engr. Co., Cleveland, Ohio

FURNACES—Pot (Oil, Gas, Electric)
Ajax Electric Company, Philadelphia, Pa.
Ofenbau Fritz, G.m.b.H. & Co., K. G., Hagen, (W. Germany)

FURNACES—Salt Bath
Ajax Electric Company, Philadelphia, Pa.

FURNACES—Strand Annealing
Ajax Electric Company, Philadelphia, Pa.
Ofenbau Fritz, G.m.b.H. & Co., K. G., Hagen, (W. Germany)

GALVANIZING EQUIPMENT—(See MACHINERY—Galvanizing Wire)

GUIDES—For Wire
Heany Industrial Ceramic Corp., New Haven, Conn.

GUIDE TIPS—For Extruding Machines (See NOZZLES)

HAMMERS—Nail Heading
Pittsburgh Carbide Die Co., Monongahela, Pa.

HAMMERS—Swaging
Sjogren Tool & Machine Co., Auburn, Mass.

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

INHIBITORS—Pickling
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INKS—Printing, for Insulated Wire
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Company, West Hanover, Mass.

INSULATING MATERIALS—
Blane Corporation, The, Canton, Mass.
Dow Corning Corporation, Midland, Mich.
General Electric Company, Insulating Materials Section, Schenectady, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Plymouth Cordage Company, Plymkraft Division, Plymouth, Mass.
U. S. Industrial Chemicals Company, Division of National Distillers & Chemical Corporation, New York, N. Y.
United States Rubber Company, Naugatuck Chemical Division, Naugatuck, Conn.

LACQUERNG SYSTEMS—See MACH.—Lacquering Electric Wire

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LIME—
Warner Co., The, Philadelphia and Bellefonte, Pa.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

MACHINE CONTROLS—Electronic
Allis Co., Louis, Milwaukee, Wisc.

MACHINERY—Armoring (Cable, Wire, Hose)
American Insulating Mach'y Co., Phila., Pa.
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Behr Machinery & Equipment Co., Rockford, Ill.
Glader Wm., Machine Works, Chicago, Ill.

MACHINERY—Blast Cleaning
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation, Mishawaka, Ind.

MACHINERY—Bobbin Winders
Hanson & Edwards, Ltd., Warrington, England
Larmuth and Bulmer, Limited, Manchester, England

MACHINERY—Bolt, Rivet, Screw, etc.
National Machinery Co., Tiffin, Ohio
Prutton Corporation, Cleveland, Ohio.
Straus-Artys Corp., Great Neck, N. Y.

MACHINERY—Braiding
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Wardwell Braiding Machine Co., Central Fall, R. I.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Bunching
Cook Mfg. Co., The, Paterson, N. J.
Edmands Company, The, Cranston, R. I.
Hanson & Edwards, Ltd., Warrington, England
Haskell-Dawes Machine Co., Philadelphia, Pa.
Larmuth and Bulmer, Limited, Manchester, England
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Niehaus K. A. Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Bundling, Scrap
Vaughn Mach'y Co., Cuyahoga Falls, Ohio

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Cook Mfg. Co., The, Paterson, N. J.
Haskell-Dawes Machine Co., Philadelphia, Pa.
Larmuth and Bulmer, Limited, Manchester, England
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Capstans and Machinery—Winding Wire)

MACHINERY—Centerless Grinding & Polishing
American Laubscher Corp., New York, N. Y.

MACHINERY—Chain Link Fence
Norton & Co., Ltd., Sir James Farmer, Manchester, England
Steel & Wire Machinery Co., Cleveland, Ohio
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Chain Making
Larmuth and Bulmer, Ltd., Manchester, Eng.
Steel & Wire Machinery Co., Cleveland, Ohio
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Closing Cable
Larmuth and Bulmer, Ltd., Manchester, Eng.
Miyazaki Iron Works, Ltd., Osaka, Japan
Niehaus, K. A. Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Coulter & MacKenzie Machine Co., Bridgeport, Conn.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio

MACHINERY—Cold Heading
Behr Machinery & Equipment Co., Rockford, Ill.
National Machinery Co., Tiffin, Ohio
Straus-Artys Corp., Great Neck, N. Y.

MACHINERY—Copper Wire Drawing
American Insulating Mach'y Co., Phila., Pa.
Cook Mfg. Co., The, Paterson, N. J.
Herborn Machinery Corporation, Hackensack, N. J.
Johnson Machinery Co., Elizabeth, N. J.
Morgardshammars Mek Verkstads A. B., Morgardshammar, Sweden
National Mach'y Exch., (Used), New York
Showa Machine Works, Ltd., Osaka, Japan
Steel & Wire Machinery Co., Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.
Whitacre Corporation, Alhambra, California

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)
Eisler Engineering Company, Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Mettler Machine Tool, Inc., New Haven, Conn.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Cutters, Hydraulic for Rod & Bar
Manco Mfg. Co., Bradley, Ill.

MACHINERY—Dead Block (Stationary Coiler)
Morgan Construction Co., Worcester, Mass.
Wells Company, Frank L., Kenosha, Wisc.
Whitacre Corporation, Alhambra, California
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Descaling Rod, Dry
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Fisher Associates, New York, N. Y.
Herborn Machinery Corporation, Hackensack, N. J.
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation, Mishawaka, Ind.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Diameter Control
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Die Making
Boulin, Victor J., Inc., New York, N. Y.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Sjogren Tool & Machine Co., Auburn, Mass.
Wayne Wire Die Co., Linden, N. J.

MACHINERY—Draw Benches
American Laubscher Corp., New York, N. Y.
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Eccentricity Control (Insulated Wire)
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Edging (See MACHINERY—Tandem Rolling and Edging Mills)

MACHINERY—Enameling
Acrometal Products, Inc., Minneapolis, Minn.
American Insulating Mach'y Co., Phila., Pa.
Cook Mfg. Co., The, Paterson, N. J.
Litzler Co., C. A., Cleveland, Ohio
Michigan Oven Company, Detroit, Mich.

MACHINERY—Extruding
Davis-Standard Division of Franklin Research and Development Corporation, Mystic, Conn.
General Engineering Company (Radcliffe) Limited, Radcliffe, England
Johnson Machinery Co., Elizabeth, N. J.
Royle, John, & Sons, Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Norton & Co., Ltd., Sir James Farmer, Manchester, England
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Flat Wire
Fenn Manufacturing Co., Newington, Conn.
Herborn Machinery Corporation, Hackensack, N. J.
Mettler Machine Tool, Inc., New Haven, Conn.
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Steel Equipment Company, Cleveland, Ohio
Steel & Wire Machinery Co., Cleveland, Ohio
Torrington Mfg. Co., Torrington, Conn.
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.

MACHINERY—Forming Wire
National Mach'y Exch., (Used), New York, N. Y.
Nilson Machine Co., A. H., Shelton, Conn.
Steel & Wire Machinery Co., Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Footage Meters
National Standard Electronics Inc., New York, N. Y.

MACHINERY—Galvanizing Wire
Miyazaki Iron Works, Ltd., Osaka, Japan
Ofenbau Fritz G.m.b.H. & Co., K. G., Hagen, (W.-Germany)
Steel & Wire Machinery Co., Cleveland, Ohio
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Whitacre Corporation, Alhambra, California
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle Manufacturing Corporation, Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Impregnation Control, Paper Cables
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.

MACHINERY—Insulating Wire
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Division of Franklin Research and Development Corporation, Mystic, Conn.
Litzler Co., C. A., Cleveland, Ohio
Michigan Oven Company, Detroit, Mich.
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine), France
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Insulation Testing (See MACHINERY—Spark Testing)

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia, Pa.
Cook Mfg. Co., The, Paterson, N. J.
Litzler Co., C. A., Cleveland, Ohio
Michigan Oven Company, Detroit, Mich.

MACHINERY—Lock Washer
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Looms, Wire Weaving
EVG., Machinen & Stahl, A. G., Zurich, Switzerland

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Diam., Insulated Wire
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wisc.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
General Engineering Company (Radcliffe) Limited, Radcliffe, England
Larmuth and Bulmer, Ltd., Manchester, Eng.
National Standard Electronics, Inc., New York, N. Y.
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Measuring and Control—Coating
Davis-Standard, Div. of Franklin Research and Development Corp., Mystic, Conn.
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Measuring Width-Flat Wire
National Standard Electronics, Inc., New York, N. Y.

MACHINERY—Nail and Tack
Behr Machinery & Equipment Co., Rockford, Ill.
Glader, Wm., Machine Works, Chicago, Ill.
National Machinery Co., Tiffin, Ohio
National Mach'y Exch. (Used), N.Y., N.Y.
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Packaging Wire
Advanced Wyrepak Co., Bridgeport, Conn.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Whitacre Corporation, Alhambra, California

MACHINERY—Patenting Wire
Ofenbau Fritz G.m.b.H. & Co., K. G., Hagen, (W.-Germany)
Whitacre Corporation, Alhambra, California

MACHINERY—Pin Making
Nilson Machine Co., A. H., Shelton, Conn.

MACHINERY—Plating
Bartell Machine Tool Corp., Rome, N. Y.
Universal Industrial Equipment Co., Secaucus, N. J.

MACHINERY—Pointing
Herborn Machinery Corporation, Hackensack, N. J.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch., (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Straus-Artys Corp., Great Neck, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio

MACHINERY—Printing on Electric Wire
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Co., West Hanover, Mass.
Gillies, Duncan M., Co., Inc., West Boylston, Mass.

MACHINERY—Re-Spooling
Acrometal Products, Inc., Minneapolis, Minn.
Bartell Machine Tool Corp., Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Davis Electric Co., Wallingford, Conn.
Emory Company, Robert J., Newark, N. J.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Herborn Machinery Corporation, Hackensack, N. J.
Miyazaki Iron Works, Ltd., Osaka, Japan
National Mach'y Exch. (Used), New York, N. Y.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y Inc., (used), Pawtucket, R. I.

MACHINERY—Rod Mill
Baldwin-Lima-Hamilton, Industrial Division, New York, N. Y.
Herborn Machinery Corporation, Hackensack, N. J.
Morgan Construction Co., Worcester, Mass.

MACHINERY—Rolling Mill
Fenn Manufacturing Co., Newington, Conn.
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Morgan Construction Co., Worcester, Mass.
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.

MACHINERY—Rubber Insulating
Davis-Standard Division of Franklin Research and Development Corporation, Mystic, Conn.
Litzler Co., C. A., Cleveland, Ohio.
Royle, John & Sons, Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y Inc., (used), Pawtucket, R. I.

MACHINERY—Serving
Pourtier Pere et Fils, Romainville (Seine), France
Wardwell Braiding Machine Co., Central Falls, R. I.

MACHINERY—Slitting Mills
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Steel Equipment Company, Cleveland, Ohio

MACHINERY—Special
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.

MACHINERY—Spring Making
Behr Machinery & Equipment Co., Rockford, Ill.
National Mach'y Exch., (Used), New York, N. Y.
Torrington Mfg. Co., Torrington, Conn.
Wafios Machinery Corp., Hackensack, N. J.
Wells Company, Frank L., Kenosha, Wisc.

MACHINERY—Straightening & Cutting
American Laubscher Corp., New York, N. Y.
Behr Machinery & Equipment Co., Rockford, Ill.
Johnson Machinery Co., Elizabeth, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N.Y.
Patterson, George C., Machine Co., Cleveland, Ohio
Steel & Wire Machinery Co., Cleveland, Ohio
Wafios Machinery Corp., Hackensack, N. J.
Wells Company, Frank L., Kenosha, Wisc.

MACHINERY—Stranding
Bartell Machine Tool Corp., Rome, N. Y.
Hanson & Edwards, Ltd., Warrington, England
Haskell-Dawes Machine Co., Phila., Pa.
Johnson Machinery Co., Elizabeth, N. J.
Krupp, Fried., Machienn-Und Stahlbau Rheinhausen, Germany
Larmuth & Bulmer Ltd., Manchester, Eng.
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Superior Tool & Manufacturing Company, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Fenn Manufacturing Co., Newington, Conn.

MACHINERY—Tandem Rolling & Edging Mills
Fenn Manufacturing Co., Newington, Conn.
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.

MACHINERY—Take-Up and Pay-Out
Acrometal Products, Inc., Minneapolis, Minn.
Advanced Wyrepak Co., Inc., Bridgeport, Conn.
American Insulating Mach'y Co., Phila., Pa.
Bartell Machine Tool Corp., Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Division of Franklin Research and Development Corporation, Mystic, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
General Engineering Company (Radcliffe) Limited, Radcliffe, England
Johnson Machinery Co., Elizabeth, N. J.
Larmuth & Bulmer Limited, Manchester, England
Litzler Co., C. A., Cleveland, Ohio.

Miyazaki Iron Works, Ltd., Osaka, Japan
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine) France
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Standard Mill Supply Co., Pawtucket, R. I.
Steel Equipment Company, Cleveland, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.
Whitacre Corporation, Alhambra, California

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine) France
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Thread Rolling
Behr Machinery & Equipment Co., Rockford, Ill.
Mettler Machine Tool, Inc., New Haven, Conn.
Prutton Corporation, Cleveland, Ohio.
Straus-Artys Corp., Great Neck, N. Y.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Tinning Wire
American Insuating Mach'y Co., Phila., Pa.
Cook Mfg. Co., The, Paterson, N. J.
Litzler Co., C. A., Cleveland, Ohio
Ofenbau Fritz G.m.b.H. & Co. K. G., Hagen, (W.-Germany)
Syncro Machine Co., Perth Amboy, N. J.
Universal Industrial Equipment Co., Secaucus, N. J.
Whitacre Corporation, Alhambra, California

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio

MACHINERY—Tube Mill, Cold Drawing
Johnson Machinery Co., Elizabeth, N. J.
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N.J.
Edmands Company, The, Cranston, R. I.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
Johnson Machinery Co., Elizabeth, N. J.
National Machinery Exchange, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Variable Speed Drives
Allis Co., Louis, Milwaukee, Wisc.

MACHINERY—Welded Wire Mesh
EVG, Maschinen and Stahl, A.G., Zurich, Switzerland
Schlatter, Ltd., H. A. Zollikon/Zurich
Sommer Products Company, Peoria, Ill.

MACHINERY—for Wire Welding
(See WELDERS—Butt and Spot and Machinery—Welding Wire Fabrics)

MACHINERY—Winding Wire
Davis Electric Co., Wallingford, Conn.
Davis-Standard Div. of Franklin Research and Development Corp., Mystic, Conn.
Emory Company, Robert J., Newark, N. J.
Enjaco Corporation, Cranston, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Larmuth and Bulmer, Limited, Manchester, England
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Standard Mill Supply Co., Pawtucket, R. I.
Steel Equipment Company, Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Laubscher Corporation, New York, N. Y.
Behr Machinery & Equipment Co., Rockford, Ill.
Cook Manufacturing Co., The, Paterson, N.J.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Fenn Manufacturing Co., Newington, Conn.
Herborn Machinery Corporation, Hackensack, N. J.
Johnson Machinery Co., Elizabeth, N. J.
Loma Machine Manufacturing Co., Inc., New York, N. Y.
Miyazaki Iron Works, Ltd., Osaka, Japan
Morgan Construction Co., Worcester, Mass.
Morgardshammars Mek Verkstads AB, Morgardshammar, Sweden
National Mach'y Exch. (Used), New York, N. Y.
Norton & Co., Ltd., Sir James Farmer, Manchester, England
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Showa Machine Works Ltd., Osaka, Japan
Societa Generale Delle Macchine Mill, Milan, Italy
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Steel Wire and Machinery Co., Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Superior Tool & Machinery Company, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.
Whitacre Corporation, Alhambra, California
Wire Machinery Inc., Chicago, Ill.

MACHINERY—Wire Preheating
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.

MACHINERY—Wire Rope
Larmuth and Bulmer, Ltd., Manchester, Eng.
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
American Laubscher Corp, New York, N. Y.
Larmuth (1947) Ltd., Cheshire, England

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, Ohio

MOTORS—Electric
Allis Co., Louis, Milwaukee, Wisc.

NAIL TOOLING—Tungsten Carbide
Pittsburgh Carbide Die Co., Monongahela, Pa.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Wickwire Brothers, Inc., Cortland, N. Y.

NIPPERS—Wire Cutting
Robinson, M. W. Co., Rockfall, Conn.

NOZZLES—For Extruding Machines
Central Tool and Mach. Co., Bridgeport, Conn.

OVENS—Cable Lacquering and Enameling
American Insulating Mach'y Co., Phila., Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Colbourne Machine Co., Winsted, Conn.
Michigan Oven Company, Detroit, Mich.

OVENS—Rod Bakers
Carl Mayer Corp., The, Cleveland, Ohio

OVENS—Welding Rod Coating
Carl Mayer Corp., The, Cleveland, Ohio

PAILS—Packaging
(See Drums—Wire Packaging)

PAPER—Coil Wrapping
Ludlow Papers, Needham Heights, Mass.

PAPER—Insulating
Ludlow Papers, Needham Heights, Mass.
Plymouth Cordage Company, Plymkraft Division, Plymouth, Mass.
Twitchell, Inc., E. W., Philadelphia, Pa.

PAY-OUT SYSTEMS—
(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS
(See COMPOUNDS—Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PLASTICIZERS—
Monsanto Chemical Company, Plastics Division, Springfield, Mass.

PLASTICS—for Wire Insulation
Blane Corporation, The, Canton, Mass.
Dow Corning Corporation, Midland Mich.
Escambia Chemical Corp., New York, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Union Carbide Plastics Company, Div. of Union Carbide Corporation, New York, N. Y.
Union Carbide Corporation, Silicones Division, New York, N. Y.
U. S. Industrial Chemicals Company, Division of National Distillers & Chemical Corporation, New York, N. Y.
United States Rubber Company, Naugatuck, Chemical Division, Naugatuck, Conn.

PRINTING WHEELS—for Electric Wire
Daniels & Co., Frank, New York, N. Y.
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Co., Inc., West Hanover, Mass.
Gillies, Duncan M., Co., Inc., West Boylston, Mass.

PULLERS AND GRIPS—for Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.
Sjogren Tool & Mach. Co., Auburn, Mass.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio

RACKS—Wire Storage
Jarke Manufacturing Co., Chicago, Illinois

REEL AND TENSION STANDS—
Acrometal Products, Inc., Minneapolis, Minn.
Mettler Machine Tool, Inc., New Haven, Conn.
Northern Indiana Steel Supply Co., Michigan City, Ind.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Republic Steel Corp., Berger Div., Canton, Ohio

REELS—Metal Bound
Durkee Mfg. Co., Inc., Pine River, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.

REELS—Plywood
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark Manufacturing Co., J. L., Rockford, Illinois
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Northern Indiana Steel Supply Co., Michigan City, Ind.
Republic Steel Corp., Berger Div., Canton, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co. Inc., Pine River, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Molded Fiber Glass Tray Co., Linesville, Pa.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Nelson Co., The, Baltimore, Md.
Northern Indiana Steel Supply Co., Michigan City, Ind.
Republic Steel Corp., Berger Div., Canton, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Wood
American Wood Working Co., Montello, Wisc.
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co., Inc., Pine River, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Nelson Co., The, Baltimore, Md.

ROD BAKERS—
(See OVENS—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Marathon Specialty Steels, Inc., N. Y., N. Y.

RODS—Wire—Non-Ferrous
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Niederrheinische Huette, A. G., Duisburg, Germany
Sumitomo Metal Industries, Ltd., Osaka, Japan
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

ROPE—Wire
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's, John A. Sons, Div., Colorado Fuel & Iron Corp., Trenton, N. J.

RUST PROOF COMPOUNDS—
(See COMPOUNDS—RUST Removing)

RUST REMOVING COMPOUNDS—
(See COMPOUNDS—RUST Preventing)

SATURATION SYSTEMS—
Watson Machine Co., Paterson, N. J.

Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

SILICONE RUBBER—For Wire Insulation
Dow Corning Corporation, Midland, Mich.

SOAPS—Industrial and Wire Drawing
(See COMPOUNDS—Wire Drawing)

SPOOLS—For Retail Sale of Wire
American Wood Working Co., Montello, Wisc.
Clark Manufacturing Co., J. L., Rockford, Illinois

SPOOLS—Plastic
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Molded Fiber Glass Tray Co., Linesville, Pa.
Plastic Mold & Eng. Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.

STAMPINGS—Steel
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.

STOCK STORAGE SYSTEMS—
Jarke Manufacturing Co., Chicago, Illinois

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.

TANKS—Ceramic, for Galvanizing
Ofenbau Fritz G.m.b.H. & Co. K. G., Hagen, (W.-Germany)

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TENSION METERS—for Wire
Boulin Instrument Corp., Pelham, N. Y.
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
Tensitron, Inc., Harvard, Mass.

TESTERS—INSULATION
(See Testing Equipment—for Dielectric Faults)

TESTING EQUIPMENT—Dielectric Faults in Insulation
Davis Electric Co., Wallingford, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Muirhead Instruments, Inc., (Addison Electric), New York, N. Y.
Peschel Electronics, Inc., Patterson, N. Y.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

TESTING EQUIPMENT—Physical
Scott Testers, Inc., Providence, R. I.

TINSEL—Electric Conductor
A. C. S. Industrial Div., American Copper Sponge Co., Inc., Woonsocket, R. I.
Montgomery Co., The, Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper Silver and False Gold Coated, etc.
(See TINSEL-Electric Conductor)

TOOLS—Nail Machine
Pittsburgh Carbide Die Co., Monongahela, Pa.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

TRANSMISSIONS—Variable Speed (See Adjustable Speed Drives)

TRAVERSE & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Davis Electric Co., Wallingford, Conn.
Emory Company, Robert J., Newark, N. J.
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

VARNISHES & LACQUERS—for Electric Wire
General Electric Company, Insulating Materials Section, Schenectady, N. Y.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.

WELDERS—Spot and Butt and Welding Wire Fabrics
Eisler Engineering Corp., Newark, N. J.
EVG, Maschinen and Stahl, A.G., Zurich, Switzerland
Herborn Machinery Corporation, Hackensack, N. J.
Micro Products Co., Chicago, Ill.
Schlatter, Ltd., H. A., Zollikon-Zurich
Sommers Products Company, Peoria, Ill.

WHEELS—for Printing on Electric Wire
Daniels & Co., Frank, New York, N. Y.
Gem Gravure Company, West Hanover, Mass.
Gillies, Duncan M., Co., Inc., West Boylston, Mass.

WIRE—Aluminum
Hudson Wire Co., Ossining, N. Y.
Malin & Co., The, Cleveland, Ohio

WIRE—Ball
Marathon Specialty Steels, Inc., N. Y., N. Y.
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Barbed
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

WIRE—Brake Lining
Hudson Wire Co., Ossining, N. Y.

WIRE—Brass and Bronze
Malin & Co., The, Cleveland, Ohio
Wisconsin Wire Works, Appleton, Wis.

WIRE—Brush
Hudson Wire Co., Ossining, N. Y.

WIRE—Bunched and Stranded
Camden Wire Co., Camden, N. Y.

WIRE—Cadmium
Stamford Processing Co., Peekskill, N. Y.

WIRE—Cold Heading
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Copper
Camden Wire Co., Camden, N. Y.
Hudson Wire Co., Ossining, N. Y.
Malin & Co., The, Cleveland, Ohio

WIRE—For Electrical Conductors
Camden Wire Co., Camden, N. Y.

WIRE—Flat
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
A. C. S. Industrial Division American Copper Sponge Co., Inc., Woonsocket, R. I.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Montgomery Co., The, Windsor Locks, Conn.
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Galvanized
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—High Carbon
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Detroit Steel Corporation, Detroit, Mich.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.

WIRE—Manufacturers
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Marathon Specialty Steels, Inc., N. Y., N. Y.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Berger Div., Canton, Ohio
Roebling's, John A., Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
U. S. Steel Corp., N. Y., N. Y.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Metalizing
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Stamford Processing Co., Peekskill, N. Y.

WIRE—Music
Malin & Co., The, Cleveland, Ohio

WIRE—Needle
Marathon Specialty Steels, Inc., New York, N. Y.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.

WIRE—Nickel Alloy
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Nickel Silver and Phosphor Bronze
Malin & Co., The, Cleveland, Ohio
Wisconsin Wire Works, Appleton, Wis.

WIRE—Oil Tempered
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Malin & Co., The, Cleveland, Ohio
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Special Shapes
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Spring
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
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Wisconsin Wire Works, Appleton, Wis.

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Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
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Continental Steel Corp., Kokomo, Ind.
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Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Malin & Co., The, Cleveland, Ohio
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Straightening and Cutting
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Stranded & Bunched
Hudson Wire Co., Ossining, N. Y.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.
Stamford Processing Co., Peekskill, N. Y.

WOOD—for Guide Rolls, Bushings, Wear Parts, etc.
American Wood Working Co., Montello, Wisc.

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(See PAPER-Creped Wrapping)

YARN TESTERS—
National Standard Electronics, Inc., New York, N. Y.
Scott Testers, Inc., Providence, R. I.

YARNS—Wire Insulating
Chadwick Yarn Company, Pawtucket, R. I.
Synthetic Thread Co., Bethlehem, Pa.

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AUTHORS—Contributing the Leading Articles to WIRE AND WIRE PRODUCTS During the year, 1960.

ACTON, W. P., Dr.
Hercules Powder Co.
Cellulose Products Dept.
Wilmington, Del.

ANNANDALE, J. K., Mgr.
Wire Flattening & Wet Wire Drawing Depts.
Rylands Brothers Limited
Warrington, England

ARMS, CLARENCE S.
Consulting Engineer
Worcester, Mass.

AVILES, HARVEY N., Dept. Chief
Test Equipment Dev. & Design Engr. Dept.
Western Elec. Co.
Baltimore, Md.

BALLARD, C. R.
Rural Electrification Administration
United States Dept. of Agriculture
Washington, D. C.

BARNES, L. V., President
The Yost Superior Co.
Springfield, Ohio

BARR, DAVID, Plant Eng.
National Electric Div.
H. K. Porter Company, Inc.
Ambridge, Pa.

BELL, JOHN A., Dev. Eng.
Western Electric Co.
Chicago, Ill.

BLISS, RICHARD, Vice Pres.
Mohawk Development Service, Inc.
Schenectady, N. Y.

BOEKE, PAUL J.
Plastics Sales Div.
Phillips Chemical Co.
Bartlesville, Oklahoma

BRANSCUM, T. E.
Plastics Sales Div.
Phillips Chemical Co.
Bartlesville, Oklahoma

BRAUN, ALFRED
Secretary-Treasurer
Braun Engineering Co.
Detroit, Mich.

BROWN, KENNETH P.
Pacific Metals Co. Ltd.
Los Angeles, Calif.

BURNS, CARLISLE V.
Process Engineer
Wire & Cable Dept.
General Electric Co.
Bridgeport, Conn.

COFER, D. B.
Technical Supervisor
Southwire Company
Carrollton, Ga.

CONTARDO, PETER
Safety Director
John A. Roebling's Sons Div.
The Colorado Fuel & Iron Corp.
Trenton, N. J.

COWEN, J. F.
Divisional Chief Eng.
Winding Wire Division
British Insulated Callender's Cables Ltd.
Melling, Lanc., England

CRAIG, R. F.
Plastics Sales Div.
Phillips Chemical Co.
Bartlesville, Oklahoma

CRIMI, F. J., Dev. Eng.
Development Department
Union Carbide Plastics Co.
Division of Union Carbide Corp.
New York, N. Y.

DARRAH, W. A., Vice Pres.
Lindberg Industrial Div.
Lindberg Engineering Co.
Chicago, Ill.

DILL, GILBERT D., Consultant
Mishawaka, Indiana

DIMLER, WILLIAM A., Jr.
Enjay Laboratories
Linden, N. J.

DOUGLASS, W., Esq.
Designer Draughtsman
W. T. Henley's Tel. Wks. Co. Ltd.
London, England

DOVE, ALLAN B.
Product Dev. Met.
Finishing Works
The Steel Co. of Canada Ltd.
Hamilton, Ont., Canada

ENTWISTLE, JAMES L., Pres.
Enjaco Corporation
Cranston, R. I.

ESPY, R. H.
Research Laboratories
Armco Steel Corporation
Baltimore, Md.

FEUER, M. M.
Sales & Project Eng.
Loewy Rolling Mills
Baldwin-Lima-Hamilton Corp.
Industrial Equipment Div.
Philadelphia, Pa.

FISCHER, CARL A.
Production Mgr.
Fischer Company
Reinach, Switzerland

FLACHBARTH, CHARLES T.
Administrative Eng.
Walker Brothers
Conshohocken, Pa.

FLATHERS, NEIL T.
Technical Service Dept.
Escambia Chemical Corp.
Research Center
Wilton, Conn.

FRAUTSCHY, JEFFERY D.
Scripps Institution of Oceanography
University of California
La Jolla, Calif.

FREDRICKSON, C. M., Technical Supt.
Southern Electrical Co.
Metals Division
Olin Mathieson Chemical Corp.
Chattanooga, Tenn.

FRODSHAM, F., Esq.
Ryland Brothers, Ltd.
Warrington, England

GILBERT, MAURICE M.
Sr. Electrical Eng.
Engineering Dept.
E. I. du Pont de Nemours & Co.
Wilmington, Del.

GILLIS R., Dept. Chief
Tonawanda Plant
Western Electric Co.
Buffalo, N. Y.

GREENE, PHILIP C., Div., Mgr.
Davis-Standard Div.
Franklin Research & Dev. Corp.
Mystic, Conn.

GROSS, A. G., Jr.
Staff Engineer
Research & Dev. Dept.
The Brush Beryllium Co.
Cleveland, Ohio

HAMMOND, L. R.
Tenite Development Dept.
Tennessee Eastman Co.
Div. of Eastman Kodak Co.
Kingsport, Tenn.

HARRINGTON, ARTHUR W., Jr.
Chief Application Eng.
The Louis Allis Co.
Milwaukee, Wisc.

HAWLEY, SUMNER H., Chief Eng.
Lewis Machine Company
Cleveland, Ohio

HAZEN, THOMAS, Dev. Associate
Development Laboratories
Union Carbide Plastics Co.
Div. of Union Carbide Corp.
Bound Brook, N. J.

HERTZOG, RUDOLF H.
Met. Eng. Steel Wire Mills Div.
John A. Roebling's Sons Div.
The Colorado Fuel & Iron Corp.
Trenton, N. J.

HOLLOWAY, W., Jr., Director
Martin Black & Co. (Wire Ropes) Ltd.
and Speedwell Wire Co. Ltd.
Coatbridge, Scotland

HOPKINS, HOWARD L.
Asst. Works Mgr. & Ch. Eng.
National Screw & Mfg. Co.
Cleveland, Ohio

HULEN, RAY, Chief Eng.
Whitacre Corporation
Los Angeles, Calif.

IMHOF, L. G.
Development Eng.
Development Dept.
Union Carbide Plastics Co.
Div. of Union Carbide Corp.
New York, N. Y.

JOHNSON, ROBERT E.
Technical Service Dept.
Escambia Chemical Corp.
Research Center
Wilton, Conn.

JOYCE, WILLIAM H., Dev. Eng.
Union Carbide Plastics Co.
Div. of Union Carbide Corp.
New York, N. Y.

KELLEY, HERBERT L.
Mgr. Adjustable Speed Drive Sales
The Louis Allis Co.
Milwaukee, Wisc.

KINNEY, JOHN E.
Sanitary Engineering Consultant
Ann Arbor, Mich.

KINSEY, CECIL J.
Asst. Chief Eng.
Republic Steel Corp.
Gadsden, Ala.

KOGA, M., Engineer
Magnet Wire Section
Hitachi Wire & Cable Ltd.
Hitachi City, Japan

KOMOSKI, HAROLD L.
Supt. Planning & Scheduling
Steel Wire Mills
John A. Roebling's Son's Div.
The Colorado Fuel & Iron Corp.
Trenton, N. J.

KRUGER, FLOYD H., Sr. Eng.
Exchange Area Cable Dept.
Western Electric Co.
Chicago, Ill.

LAWRENCE, ROBERT C., Jr.
Technical Sales Rep.
Chemical Products Corp.
East Providence, R. I.

LEHFELDT, W., Dr.
Dr. Lehfeldt Co., G.m.b.H.
Heppenheim a.d.B. Germany

LEVENHAGEN, A. W., Pres.
Molded Fiber Glass Tray Co.
Linesville, Pa.

LEVIN, SUMNER H.
Technical Director
The Blane Corp.
Canton, Mass.

LEWIS, E. H., Pres.
Western Insulated Wire Co.
Los Angeles, Calif.

LOVERING, EARLE W.
Dir. of Dev. Engineering
and Asst. Technical Mgr.
Scovill Manufacturing Co.
Waterbury, Conn.

LOWE, CHARLES
Technical Sales Rep.
Union Carbide Plastics Co.
Div. of Union Carbide Corp.
New York, N. Y.

McCLAIN, KENNETH E.
Tool Engineer
Rochester Products Div.
General Motors Corp.
Rochester, N. Y.

McMURRAY, JOHN C.
Research Asst. to the Pres.
Waterbury Farrel Foundry & Machine Co.
Div. of Textron, Inc.
Waterbury, Conn.

MAGIE, PETER M., Vice Pres.
Bemol, Inc.
Boston, Mass.

MASE, KIYOSHI, Dr.
Hitachi Wire & Cable Ltd.
Hitachi City, Japan

MILLER, EDGAR T.
Mgr., Wire Die Sales
Firth Sterling, Inc.
Pittsburgh, Pa.

MURPHY, ROBERT E., Eng.
Test Equipment Dev. & Design Engr. Dept.
Western Elec. Co.
Baltimore, Md.

NEWMAN, W. W., Jr.
Rural Electrification Admr.
United States Dept. of Agriculture
Washington, D. C.

NUSSBAUM, A. I., Vice Pres.
Loma Machine Mfg. Co., Inc.
New York, N. Y.

O'GRADY, J. V.
Asst. to V. P. — Engineering
Syncro Machine Company
Perth Amboy, N. J.

OWENS, WILLIAM J., Jr.
Engineer — Mfg. Standards
Wire and Cable Dept.
General Electric Co.
Bridgeport, Conn.

PALLAS, VERNON R., Mgr.
Technical Service Laboratory
Escambia Chemical Corp.
Research Center
Wilton, Conn.

PARET, R. E.
Stainless Steel Specialist
American Iron & Steel Institute
New York, N. Y.

PERRY, ROSS W., Mgr.
Cold Forming Div.
Parker Rust Proof Co.
Detroit, Mich.

PETZOLD, LAWRENCE C.
Hercules Powder Co., Inc.
Wilmington, Del.

PIPER, ROBERT W.
Western Representative
Brooks Oil Company
Hollywood, Calif.

PLANER, F. E., Dr.
Addison Electric Co. Ltd.
London, W. 10, England

POLLOCK, MALCOLM J.
Ch. Ind. Eng., Wire Mills
John A. Roebling's Sons Div.
The Colorado Fuel & Iron Corp.
Trenton, N. J.

RIGBY, JOHN
Managing D[illegible]
John Rig[illegible]ens Ltd.
Low Moor, [illegible]ord, England

ROBERTS, N. W.
Process Dev. Laboratory
General Electric Co.
Pittsfield, Mass.

SICKELS, EDMUND D., Editor
Wire and Wire Products
Stamford, Conn.

SILVERMAN, MAXWELL
Scripps Institution of Oceanography
University of California
La Jolla, Calif.

SMITH, THEODORE B., Pres.
John Hassall, Inc.
Westbury, L. I., N. Y.

SMITH, W. MAYO, Dr.
V. P. & Dir. of Research
Escambia Chemical Corp.
Research Center
Wilton, Conn.

SPOHN, W. W.
E. I. du Pont de Nemours & Co.
Wilmington, Del.

STEELE, MAURICE G.
M. G. Steele Company
Rome, N. Y.

STERN, E. GEORGE
Research Prof., Wood Construction
Virginia Polytechnic Institute
Blacksburg, Va.

STURGEON, G. McH.
Grad. I., Mech. E.
Sheffield Laboratories
The British Iron & Steel Research Assoc.
Sheffield, England

STURROCK, A. G.
Chief Metallurgist
Wycoff Steel Co.
Chicago, Ill.

SUBA, MICHAEL M.
Sales Mgr., Extrusion Materials
Bakelite Company
Div. of Union Carbide Corp.
New York, N. Y.

TARBOX, A. E., Dev. Eng.
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Union Carbide Plastics Co.
Division of Union Carbide Corp.
New York, N. Y.

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West Georgia College
Carrollton, Ga.

WIZIARDE, JACK
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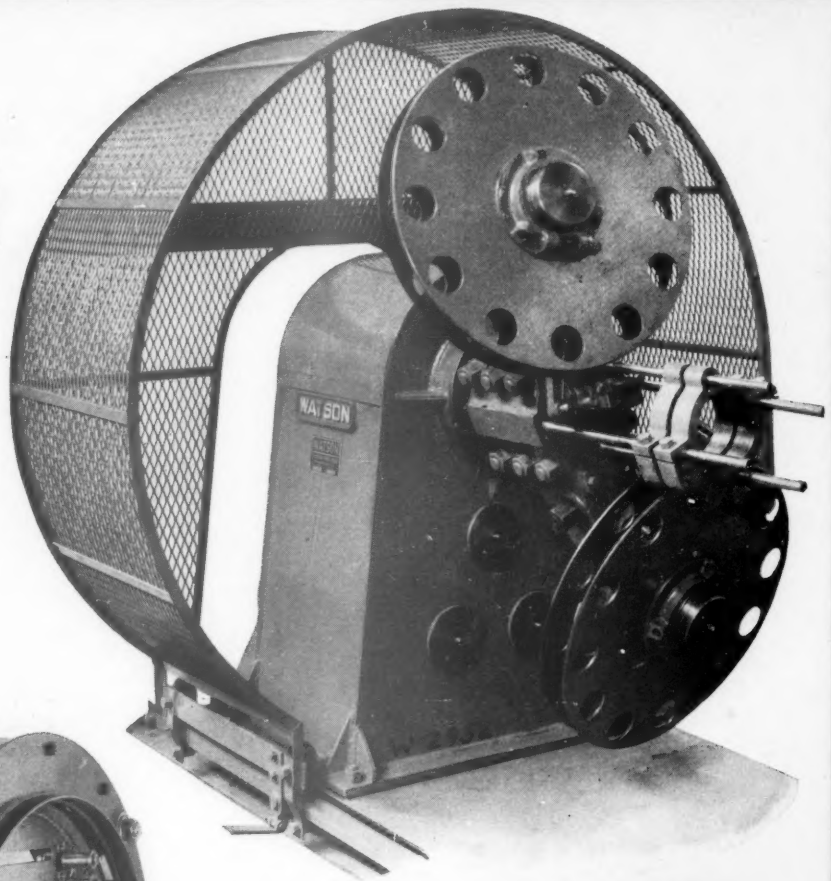
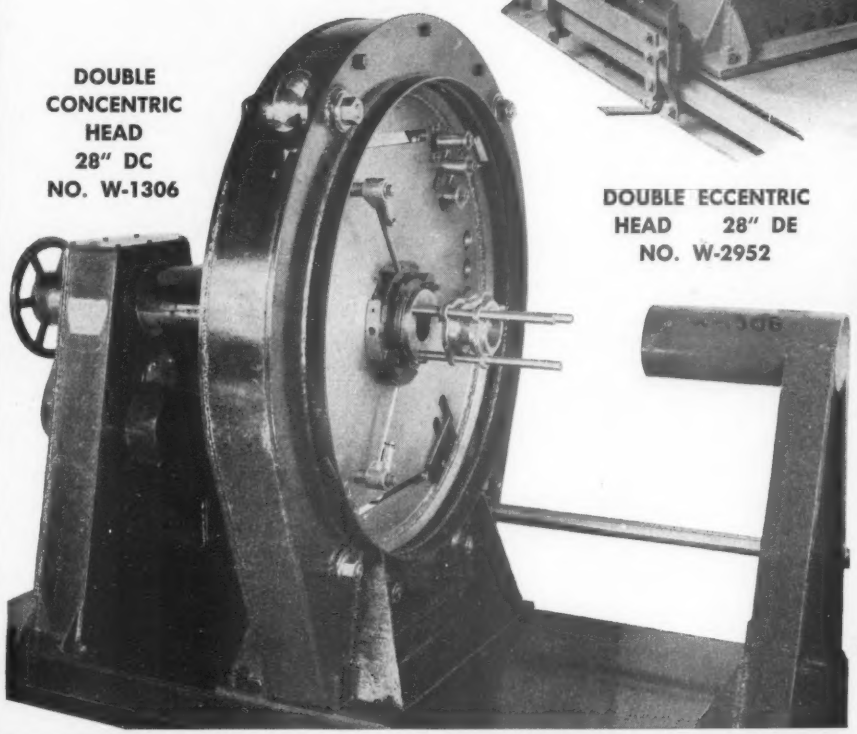
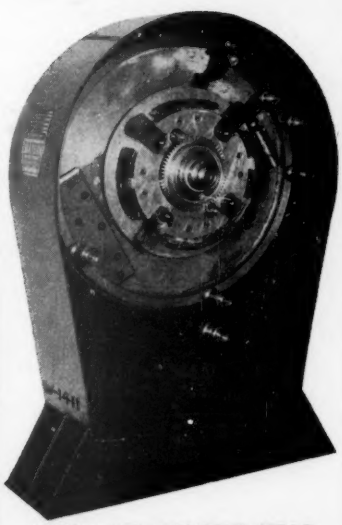


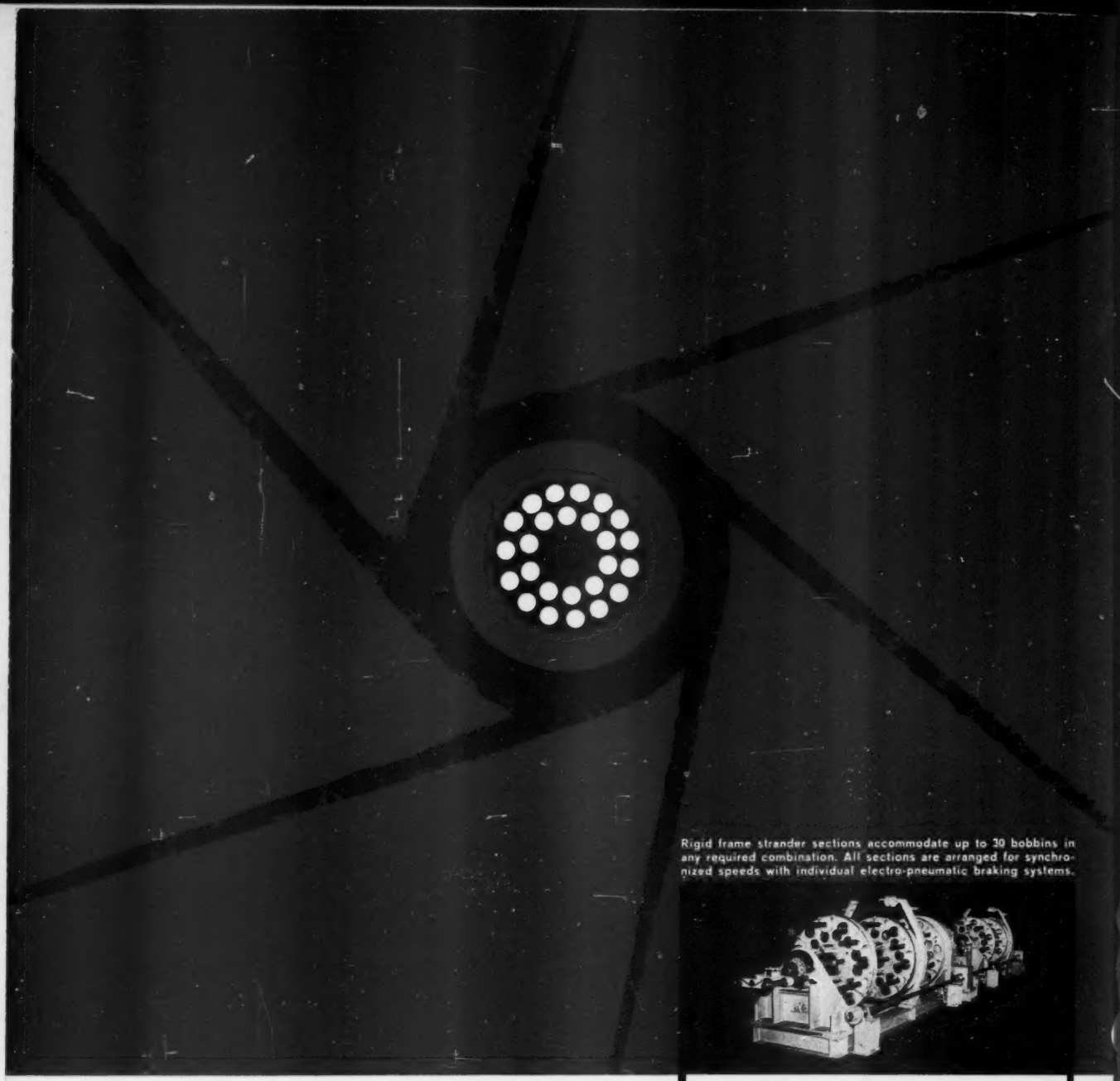
DOUBLE
CONCENTRIC
HEAD
28" DC
NO. W-1306



DOUBLE ECCENTRIC
HEAD 28" DE
NO. W-2952



SINGLE CONCENTRIC HEAD
19" SC-BT NO. W-1411



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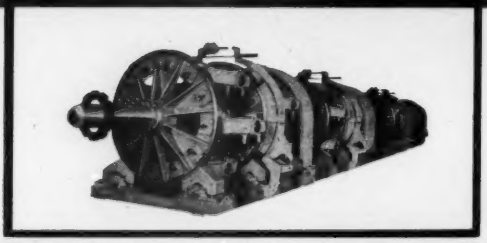

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